

Table of Contents

| Prefo | асе | V |
|-------|--|------|
| Orga | nising Committee | vii |
| Main | Sponsors | xiii |
| Supp | porting Sponsors | xv |
| Table | e of Contents | xvii |
| 082 | Probabilistic Risk Analysis in the Overhaul of Aero-engines using a combination of Bayesian Networks and Fuzzy Logic aiming at meeting Civil Aviation Agency Regulations and the requirements AS9100 – A Case Study Alexandre Magno Ferreira de Paula, José Cristiano Pereira, and Giovane Quadrelli | 1 |
| 110 | Comparing Distributed and Integrated Hazard Analysis Environments Axel Berres, Sascha Lübbe, Michael Schäfer, and Viola Voth | 9 |
| 216 | Influence of Cargo Arrangement on Aircraft Mass Center of Gravity Marta Woch, Justyna Tomaszewska, Mariusz Zieja, and Bandar Alotaibi | 17 |
| 288 | Designing Reliable, Data-Driven Maintenance for Aircraft Systems with Applications to the Aircraft Landing Gear Brakes Juseong Lee, Mihaela Mitici, Sunyue Geng, and Ming Yang | 25 |
| 315 | Introducing the Structured Exploration of Complex Adaptations to learn from operations in an Air Navigation Service Provider Riccardo Patriarca, Joerg Leonhardt, and Joerg Leonhardt | 33 |
| 337 | Application of Monte Carlo Simulation to the Reliability Estimation of an Experimental Data Communication System <i>Gianpiero Buzzo, Lidia Travascio, and Angela Vozella</i> | 41 |
| 556 | FBG-based Optical Sensor Networks for Thermal Measurements in Aerospace Applications Alessandro Aimasso, Matteo D.L. Dalla Vedova, Paolo Maggiore, and Gaetano Quattrocchi | 48 |
| 652 | Risk Analysis of Unmanned Air Vehicle and Beyond Visual Line of Sight Flights: How Does Systems Thinking Add to the Specific Operations Risk Assessment Method? Selcuk Yilmaz, Jon Tømmerås Selvik, and Ove Njå | 56 |
| 014 | Estimation of Industrial Assets Ageing and Maintenance Efficiency with Interval Censored Data Théo Cousino, Florent Brissaud, Leïla Marle, Laurent Doyen, and Olivier Gaudoin | 64 |

| 135 | Application of Industry Standards and Management Commitment to Asset Management in a Petrochemical Company Ian Els and Krige Visser | 72 |
|-----|---|-----|
| 522 | A General Framework Proposal for Modelling Complex Production Systems Considering Maintenance and Operative Factors under Uncertain. Case Study in Mining Industry Tomás Grubessich, Raúl Stegmaier, Pablo Viveros, and Fredy Kristjanpoller | 80 |
| 191 | Managing Asset and Supply Chain Resilience Using A Digital Risk Twin Jake Langton, Evan Apostolou, and Paddy Conroy | 88 |
| 009 | Exploring How Automated Technology and Advanced Driver-Assistance Systems (ADAS) Are Taught in the Norwegian Driver-Training Industry. A Qualitative Study <i>Jan Petter Wigum and Gunhild Birgitte Sætren</i> | 96 |
| 012 | Advanced Markov Modeling and Simulation for Safety Analysis of Autonomous Driving Functions up to SAE 5 for Development, Approval and Main Inspection Ivo Häring, Yupak Satsrisakul, Jörg Finger, Georg Vogelbacher, Corinna Köpke, Fabian Höflinger, and Patrick Gelhausen | 104 |
| 048 | Shift from Simulation to Reality: Test Carrier Architecture for Seamless Embedding of Highly Automated Driving Functions Redge Melroy Castelino, Christian Steger, Arne Lamm, and Axel Hahn | 112 |
| 261 | Reliability of Fault-Tolerant System Architectures for Automated Driving Systems Tim M. Julitz, Antoine Tordeux, and Manuel Löwer | 120 |
| 293 | Adaptive Situated and Reliable Prediction of Object Trajectories Navreet S. Thind, Daniel A. Ameyaw, and Dirk Söffker | 128 |
| 259 | Major Accidents and Risk Prevention Policies in the Chemical and Petrochemical Industry in France: Paving the Way Towards an Assessment Framework Scarlett Tannous, Myriam Merad, and Jan Hayes | 136 |
| 035 | Seveso Inspections on Process Industry During the Pandemic: Reorganization Measures and Management Continuity Romualdo Marrazzo and Fabrizio Vazzana | 144 |
| 475 | High-Pressure Jet and Cylindrical Obstacles in Series: A CFD Study Giovanni Romano, Paolo Tombini, Fabio Ferrario, Anna Mormile, and Valentina Busini | 150 |
| 489 | Process Risk Prioritization of Metalorganic Chemical Vapor Deposition Device Xuan Liu, Huixing Meng, Weizhen Yao Xianglin Liu, and Chao Zhang | 158 |
| 026 | A Glimpse of Sustainability Culture? Reflecting the Concept of Sustainability in Society's Resilience Christine Große | 165 |
| 089 | Taking Public Concerns into Account as a Risk Management Criterion. A Case Study Christian Foussard, Wim Van Wassenhove, and Cédric Denis-Rémis | 173 |
| 319 | The Relevance of Resilience Engineering and Community Resilience for Future Maritime Transport Systems Trine Marie Stene and Trond Kongsvik | 181 |

| 657 | Implementing Societal Values as Drivers for Performance Indicators to Improve Resilience Analysis of Critical Infrastructure Ingo Schönwandt, Jens Kahlen, and Daniel Lichte | 188 |
|-----|---|-----|
| 282 | A Probabilistic Approach to Dynamic Risk Scenario Identification Moritz Schneider, Oscar Hernán Ramírez-Agudelo, Lukas Halekotte and Daniel Lichte | 196 |
| 345 | Enabling and Impeding Factors for Organizational Adaptive Capacity – A Review of the Literature Henrik Hassel and Alexander Cedergren | 204 |
| 388 | A Study on Finding an Optimal Response Strategy Considering Infrastructures in an Agent-based Radiological Emergency model using a Deep Q-network Gibeom Kim and Gyunyoung Heo | 212 |
| 481 | Methodology to Support Municipalities in the Crisis Management of Levee Failure Constance Péronneau, Noémie Fréalle, Florian Tena-Chollet, Sophie Sauvagnargues, Bertrand Marion, and Vincent Boudières | 218 |
| 042 | Risk Management Plan for Metro Station Reconstruction Lenka Střelbová, Dana Procházková, and Petr Šrytr | 226 |
| 100 | Risk Management of Selected Elements of Critical Transport Infrastructure Jan Prochazka and Dana Prochazkova | 234 |
| 279 | Combinatorial Optimization of Empirical Heuristics for Water Distribution Networks Restoration Shunichi Tada, Kengo Hayashida, Taro Kanno, Yuji Kawase, and Kazuo Furuta | 242 |
| 333 | Vulnerability Analysis of Interdependent Energy Infrastructures with Centralized and Decentralized Operator Models Andrea Bellè, Zhiguo Zeng, and Anne Barros | 248 |
| 303 | Social Robots in Public Space: Use Case Development Hanne Kristine Rødsethol and Yonas Zewdu Ayele | 256 |
| 385 | Characterizing Behavioral Modeling in Systems and Safety Model-Based Engineerings and their Overlap for Consistency Checking Stephen Creff and Michel Batteux | 265 |
| 390 | Using Risk Analysis for Anomaly Detection for Enhanced Reliability of Unmanned Autonomous Systems Rialda Spahic, Vidar Hepsø, and Mary Ann Lundteigen | 273 |
| 517 | The World of AI Algorithms: Challenges for Uncertainty Communication Sanja Mrkšić Kovačević and Frederic Bouder | 281 |
| 537 | Enhanced Power and Communication Modeling in Cyber-Physical Distribution Grids for Resilience-based Optimization Youba Nait Belaid, Anne Barros, Yiping Fang, Zhiguo Zeng, Anthony Legendre, and Patrick Coudray | 289 |
| 443 | Digital Security in the Norwegian Power Systems' Supply Chains Sina Rebekka Moen, Sigrid Haug Selnes, Janne M. Hagen, and Ove Njå | 296 |

| 099 | Cybersecurity Design for Railway Products Jan Prochazka, Petr Novobilsky, Dana Prochazkova, and Svatoslav Valoušek | 304 |
|-----|---|-----|
| 277 | Illustration of Cybersecurity and Safety Co-Engineering using EBIOS RM and IEC 61508 Pierre-Marie Bajan, Martin Boyer, Anouk Dubois, Jérôme Letailleur, Kevin Mantissa, Yohann Petiot, Jeremy Sobieraj and Mohamed Tlig | 312 |
| 295 | The Effect of Regulation and Audits on Implementation of Cybersecurity Controls in Norwegian Grid Companies Jon-Martin Storm, Janne Hagen, and Sigrid Haug Selnes | 320 |
| 328 | A New Way to Generate Automatically the Attacks Scenarios and Combine them with Safety Risks Tamara Oueidat, Jean-Marie Flaus, and François Massé | 327 |
| 148 | Techno-Economic Analysis for Decarbonising of Container Vessels Mei Ling Fam, Zhi Yung Tay, and Dimitrios Konovessis | 335 |
| 189 | Optimizing Multiple Reinsurance Contracts Arne Bang Huseby | 343 |
| 224 | Optimal Reinsurance Contracts under Conditional Value-at-Risk Kristina Rognlien Dahl, Arne Bang Huseby, and Marius Helvig Havgar | 351 |
| 353 | Dynamic Decision-Making: an Application in the Oil and Gas Industry Joaquim Rocha dos Santos, Danilo Taverna Martins Pereira de Abreu, and Marcelo Ramos Martins | 359 |
| 116 | Applying FRAM to Emergency Management Capability Assessment in the Context of Interdependent CI Systems Mariachiara Piraina, Paolo Trucco, and Federico Sciuto | 367 |
| 227 | A Safety-II Approach for Safety Management During Conducting a Chemical-Related Experiment in a Laboratory Cui Huanhuan, Zhang Renyou, Chen Zikai, Cong Ran, Wang Cheng, and Nuerlanhan Bayan | 375 |
| 267 | Application of Functional Resonance Analysis Method to Identify Variabilities in the Maintenance Process of Rotary-Wing Aircraft Engines Jefferson Santos de Oliveira, Marcelo Vitor José Alves, Leandro Sette Linhares de Azevedo, Moacyr Machado Cardoso Junior, and Ligia Maria Soto Urbina | 383 |
| 441 | Using the Functional Resonance Analysis Method for Modelling Social Interactions in Socio-Technical Systems: An Exploratory Study Vinícius Bigogno-Costa, Moacyr Machado Cardoso, Tarcísio Abreu Saurin and Tor Olav Grøtan | 391 |
| 097 | Quantitative Assessment of the Benefit-Risk Ratio in the Design of a Medical Device Roberto Filippini | 399 |
| 220 | Improving Quality and Safety by Independent, External Investigation? The Norwegian Healthcare Investigation Board Framework Sina Furnes Øyri and Siv Hilde Berg | 407 |

| 651 | Assessing Risk Awareness with Hospital Information Systems Margarida Martins, João Barata, and Noel Carroll | 416 |
|-----|---|-----|
| 656 | Designing of the Medical Data Management System with Reliable Microservice Architecture Jozef Kostolny, Miroslav Kvassay, and Matus Troksiar | 424 |
| 010 | Probabilistic Risk Analysis of Human Failure on Fluid Penetrant Inspection via CAPEMO Causal Model André Luis G. Andriolo, José Cristiano Pereira, Alexandre Sheremetieff, and Fábio Esperança | 432 |
| 021 | The use of the Kirkpatrick Assessment Method to Reduce the Risk of Failure of Technical Training Targeting at Improving Its Effectiveness and the Quality of Marine Equipment Maintenance Processes – A Case Study on AHTS Vessels Namir Furtado Vieira Junior, José Cristiano Pereira, and Alexandre Magno Ferreira de Paula | 440 |
| 033 | Screening Method of Eye Movement Parameters for Unsafe Behavior of Drilling Operators Chuangang Chen, Jinqiu Hu, and Huizhou Liu | 448 |
| 060 | Concepts For Operating Multiple Petroleum Facilities From a Single Control Centre Lars Hurlen, Maren Eitrheim, Grete Rindahl, and Vidar Hepsø | 457 |
| 083 | Development of a Method for Assessing the Reliability of Emergency Response Organizations in Korean Nuclear Power Plants Jaehyun Kim and Jonghyun Kim | 465 |
| 087 | Design of, and Learning from Simulator-based Contingency Training in Aquaculture Caroline Kristensen, Siri Mariane Holen, Gunnar Lamvik, Eivind H. Okstad, and Ranveig Kviseth Tinmannsvik | 473 |
| 119 | Advanced Situation Awareness, Human Vigilance, and Sensitivity in Complex and Dynamic Industrial Systems: Perspectives Towards Enhancing Systems Resilience Under Digitalization Contexts Mohammad Bakhshandeh and Jayantha P. Liyanage | 480 |
| 152 | Modelling Variations in Newborn Life Support Procedure Using Colored Petri Nets Alfian Tan, Rasa Remenyte-Prescott, Michel Valstar, and Don Sharkey | 489 |
| 256 | Comparing the Effect of Task Complexities on the Occurrence of EOOs and EOCs in an Analog and Digital Environment Jinkyun Park, Inseok Jang, and Yochan Kim | 497 |
| 278 | Supervising Autonomous Ships – A Simulator Study with Navigators and Vessel Traffic Supervisors Alf Ove Braseth, Magnhild Kaarstad, Jon Bernhard H⊘stmark, and Gudbrand Strommen | 505 |
| 355 | Context Awareness for Uncertainty Reduction in PSA and HRA Gueorgui Petkov | 512 |
| 372 | A Data Driven Approach to Elicit Causal Links between Performance Shaping Factors and Human Failure Events Karl Johnson, Caroline Morais, Lesley Walls, and Edoardo Patelli | 520 |

| 387 | Human Reliability Study in Manual Clamping of Turning Workpieces Jennifer Brade, Adrian Albero Rojas, Max Engelmann, Franziska Klimant, Joachim Regel, and Martin Dix | 528 |
|-----|--|-----|
| 392 | Human Operator Reliability as a Support for the Safety Assurance of Autonomous Railway Systems: A Look at Organizational and Human Factors Philippe Richard, Christopher Paglia, Abderraouf Boussif, and Quentin Gadmer | 536 |
| 459 | Investigation and Evaluation of Marine Accidents in Terms of Grounding and Contacts/Collisions in the English Channel Utilising the HFACS-PV Approach Sean Loughney, Kenneth Ngwoke, Jin Wang, Serdar Yildiz, and Özkan Uğurlu | 544 |
| 546 | Medium-Sized City Pedestrian Evacuation in a Flood Context: Simulation using an Agent Based Model Cyril Orengo, Florian Tena-Chollet, and Sophie Sauvagnargues | 552 |
| 589 | Estimation of Human Error Probability Considering Difference between Data Subsets Sun Yeong Choi and Yochan Kim | 560 |
| 612 | Updating HRA for Digital Environments Mary Presley, Jeffrey A. Julius, Andrew Wright, Katherine Gunter, and Erin Collins | 566 |
| 095 | Applicability of Risk-based Inspection Methodology to Hydrogen Technologies: A Preliminary Review of the Existing Standards Alessandro Campari, Maryam Alikhani Darabi, Federico Ustolin, Antonio Alvaro, and Nicola Paltrinieri | 574 |
| 161 | Evaluating the Risks of using Magnesium Hydride for Zero Emission Mobility Bjørn Axel Gran, Kjell Løvold, and Stefano Deledda | 582 |
| 204 | Systems Thinking as a Basis for Regulating Hydrogen Safety in Society Brynhild Stavland and Ove Njå | 590 |
| 240 | Hazard Identification for Gaseous Hydrogen in Storage, Transportation, and Use Shenae Lee, Maria Vatshaug Ottermo, Knut Vaagsaether, Henning Henriksen, Odd-Arne Lorentsen, Solfrid Håbrekke, Stig Johnsen, and Nicola Paltrinieri | 598 |
| 056 | Reliability Centered Maintenance – Quantitative (RCM-Q) Applied to Hydropower Plants: Analysis from the Zero-Base Transition to the Quantitative Process Marjorie Maria Bellinello, Marcelo Rodrigues, Emerson Rigoni, Carlos Henrique Mariano, Raphael Augusto de Souza Benedito, Paulo Sérgio Walenia, Yago Lafourcade Baracy, Gilberto Francisco Martha de Souza, and Gisele Maria de Oliveira Salles | 606 |
| 136 | Simulation of a Multi-system Scenario Comparing Non-derating Versus Reliability-Adaptive Systems Larissa Perlitz and Uwe Kay Rakowsky | 614 |
| 137 | New approach to Predict Warranty Costs using a New Bivariate Reliability Prediction Model Abderrahim Krini and Josef Börcsök | 622 |
| 138 | An Adaptive Hybrid Maintenance Policy for a Gamma Deteriorating Unit in The Presence of Random Effect Nicola Esposito, Bruno Castanier, and Massimiliano Giorgio | 628 |

| Dracandinas | the 32nd Europed | an Cafatu an | d Daliability | Conforance | /ECDEI | າດາາ |
|----------------|------------------|---------------|---------------|------------|--------|------|
| Proceedinas oi | une 32na Europea | an Saiety and | ı Reliabilitv | Conterence | IESKEL | 2022 |

xxiii

| 139 | A Prescriptive Maintenance Policy for a Gamma Deteriorating Unit Nicola Esposito, Bruno Castanier, and Massimiliano Giorgiov | 635 |
|-----|--|-----|
| 264 | Functional Modeling and Reasoning for Reliability Centered Maintenance Mengchu Song and Morten Lind | 642 |
| 371 | Jam Detection in Waste Sorting Conveyor Belt based on k-Nearest Neighbors Calliane You, Olivier Adrot, and Jean-Marie Flaus | 650 |
| 468 | Impact of Imperfect Monitoring on the Optimal Condition-Based Maintenance Policy of a Single-Item System Matthieu Roux, Yi-Ping Fang, and Anne Barros | 658 |
| 627 | A Survey of Multi-Component Maintenance Optimization Subject to Condition-Based Maintenance Abu MD Ariful Islam and Jørn Vatn | 665 |
| 038 | A System-Theoretic Approach to Hazard Identification of Operation with Multiple Autonomous Marine Systems (AMS) Ruochen Yang, Jens Einar Bremnes, and Ingrid Bouwer Utne | 673 |
| 063 | Proposal of Reduction of Emissions of Marine Shipment Ladislav Mysak, Dana Prochazkova, Vaclav Dostal, and Jan Prochazka | 681 |
| 113 | Probabilistic Model Estimating the Expected Maximum Roll Angle for a Vessel in the Turn Jakub Montewka, Przemysław Krata, Tomasz Hinz, Mateusz Gil, and Krzysztof Wróbel | 689 |
| 120 | Towards a Risk Maturity Model for the Maritime Authorities: A Literature Review on Recent Approaches in Different Industrial Sectors Valtteri Laine, Osiris Valdez Banda, and Floris Goerlandt | 698 |
| 144 | Fault Tree Analysis of a Deepwater Christmas Tree System Focusing on Leakages and Stopping of Production Fernanda M. de Moura, Adriana M. Schleder, Marcelo R. Martins, Leonardo O. de Barros, and Rene Thiago C. Orlowski | 706 |
| 145 | Methodology to Define the Probability of Detection of Non-destructive Techniques in an Offshore Environment João Pedro B. Cuba, Marcelo R. Martins, Adriana M. Schleder, Leonardo O. de Barros, and Rene Thiago C. Orlowski | 713 |
| 169 | Effect of Potential Autonomous Short-sea Shipping in the Adriatic Sea on the Maritime Transportation Safety Ivana Jovanović, Nikola Vladimir, Maja Perčić, and Marija Koričan | 721 |
| 250 | A Web Interface for Oil Spill Detection in Images via Feature Extraction and Machine Learning Ana Cláudia Souza Vidal de Negreiros, Isis Didier Lins, Caio Souto Maior, and Márcio das Chagas Moura | 729 |
| 318 | Computer Vision for Remote Inspection Geir Hamre and Yanzhi Chen | 736 |

| 346 | Simulation Based Model for the Evaluation of the Design Impact Force from Ship Collision on Bridge Piers Simona Miraglia, Nicolas Preben Kraunsøe Frandsen, Christian Mathias Faber, Toke Koldborg Jensen, and Søren Randrup-Thomsen | 744 |
|-----|---|-----|
| 431 | Collision Avoidance for Autonomous Ships (MASS): Making Assumptions About Other Ships Intended Routes Thomas Porathe | 752 |
| 447 | Impact of the Ice Navigation Experience on the Determination of CPT for BN Model Focusing on Arctic Navigation Sheng Xu, Ekaterina Kim, and Stein Haugen | 760 |
| 595 | In the Aftermath of the Viking Sky Incident: Cruise Ship Safety in Norway and Potential Risk Reduction Measures Ingrid Bouwer Utne and Arve Dimmen | 768 |
| 064 | Safety and Reliability as Part of Sustainability in Ocean-Based Industries E. Leirvåg, T. Sivalingam, S. Haugen, T. S. Johansen, and P. Meyer | 776 |
| 091 | What Affects the Risk of Recreational Craft Users? – A Literature Review Christoph A. Thieme, Pål Brennhovd, Randi Linløkken, Sverre Flatebø, and Tove Aasland Torgersen | 783 |
| 638 | Component Criticality Rating of a Subsea Manifold using FMECA Andressa S. Nicolau, Maximiano C. Martins, Paulo Fernando F. Frutuoso e Melo, Adriana M. Schleder, Marcelo R. Martins, Leonardo O. De Barros, and Rene Thiago C. Orlowski | 791 |
| 516 | An Application of Semi-Supervised Learning to Sparsely Labelled Data Dominik Brüggemann, Marcin Hinz, and Stefan Bracke | 799 |
| 524 | The Application of the K-means Algorithm for the Unsupervised Analysis of Surface Topographies Marcin Hinz, Doha Meslem, and Stefan Bracke | 807 |
| 600 | Analysis of Adverse Events Related to the Use of Drones in Material Handling at a Chemical Manufacturer Site Agnieszka A. Tubis and Arkadiusz M. Żurek | 815 |
| 029 | Gamma Process Based Value of Information Analysis: An Exposition XX. Yuan and Mahesh D. Pandey | 822 |
| 140 | On the Influence of Market-Specific Sales Volumes and Load Spectra of Different Applications on Operational Reliability with Confidence Interval Peter Zeiler | 830 |
| 178 | A Self-Adapting Reconfiguration Process for The Failure Management of Highly Automated Vehicles Timo Frederik Horeis, Johannes Heinrich, and Fabian Plinke | 838 |
| 473 | Comparison of Quantitative Evaluations by FTA-Type Analytical Approach and MBSA-Type Simulation Approach by Petri Nets Thibault Montigaud, Frédéric Deschamps, Bastien Malbert, and Géraldine Paillart | 846 |

| 037 | Review on Python Toolboxes for Kriging Surrogate Modelling Alessio Faraci, Pierre Beaurepaire, and Nicolas Gayton | 854 |
|-----|---|-----|
| 212 | Comparative Study on Multivariate Trend Analysis by the Example of Traction Batteries in the Usage Phase Alicia Puls and Stefan Bracke | 862 |
| 800 | Risk Management in Natural Gas Pipelines: A Hybrid Approach for Optimum Portfolio Selection Ramon Swell Gomes Rodrigues Casado, Marcelo Hazin Alencar, and Adiel Teixeira de Almeida | 870 |
| 023 | A Multidimensional Assessment Framework for NATECH Events Related to Hydrological Disasters in Natural Gas Pipelines Francisco Filipe Cunha Lima Viana, Lucas Borges Leal da Silva Marcelo Hazin Alencar and Adiel Teixeira de Almeida | 878 |
| 059 | Flood Risk Identification and Analysis for Pressure Equipment Antonino Muratore, Giuseppe Giannelli, Vincenzo Nastasi, Giuseppe Sferruzza, Giovanni Grillone and Corrado Delle Site | 885 |
| 090 | Resilience of Healthcare Systems in Natural Disaster – A case Study in Henan Rainstorm Yixin Zhao, Xiuzhu Gu, and Yiliu Liu | 891 |
| 103 | The importance of the Safety Management System in the Prevention of NATECH Risks on the Italian Territory Romualdo Marrazzo and Fabrizio Vazzana | 899 |
| 198 | Windy Smart Grid: Forecasting the Impact of Storms on the Power System William Lair, Grégory Michel, François Meyer, Marc Chapert, and Hélène Decroix | 905 |
| 043 | Risk Management Plan for Steam Generator Maintenance at Nuclear Power Plan Karel Vidlak and Dana Prochazkova | 913 |
| 044 | Reliability of Molten Salt Static Corrosion Tests Michal Cihlář, Dana Procházková, Pavel Zácha, Jan Prehradný, Václav Dostál, and Martin Mareček | 921 |
| 079 | Risk Management Plan for Long-term Power Blackout for Temelin Nuclear Power Plant Jan Jirousek and Dana Prochazkova | 929 |
| 156 | Probabilistic Safety Assessments for SMRs: Unique Considerations and Challenges Shahen Poghosyan and Dennis Henneke | 937 |
| 159 | Application of the Structured Safety Argumentation Approach Guidance on the Halden Safety Fan Xueli Gao and Peter Karpati | 945 |
| 231 | Visualizing Key Features of Nuclear Power Plants in Abnormal Situation Ji Hyeon Shin, Jae Min Kim, and Seung Jun Lee | 953 |
| 291 | Independently Verifiable Evidence for Safety Assurance – A Survey Analysis Yonas Zewdu Ayele and Coralie Esnoul | 959 |

| 301 | Microreactors: Challenges and Opportunities as Perceived by Nuclear Operating Personnel Magnhild Kaarstad and Robert McDonald | 968 |
|-----|---|------|
| 313 | Recent Risk Analysis of External Hazards Impact on Czech NPPs Operation Jaroslav Holý, Stanislav Hus'ák, Roman Aldorf, Ladislav Kolář, Jan Kubíček, and Milan Jaroš | 976 |
| 323 | A Study of Emergency Planning Zone Determination for a Korean SMR Considering US and IAEA Criteria Kilyoo Kim, Sangbaik Kim, Seokjung Han, and Omar Natto | 983 |
| 350 | Exploring Site Risk for a Multi Unit SMR Site Robbie Houldey, Lavinia Raganelli, Garth Rowlands, and John May | 989 |
| 363 | All Creatures Great & Small: A Brief Survey of the Impact of Flora/Fauna on Nuclear Power Plants John David Hanna | 997 |
| 386 | Development of a Fire PSA Program for Korean Nuclear Power Plants Dae Il Kang and Yong Hun Jung | 1005 |
| 421 | Methodology for Risk Assessment of Blackout on Maritime Nuclear Power Plants Gabe Cesar A. and Souza Gilberto F. M. | 1010 |
| 430 | A Framework of Safety Margin Simulation for Optimized Emergency Operation in Nuclear Power Plants Jung Sung Kang and Seung Jun Lee | 1019 |
| 434 | Benchmark Exercise on Nuclear Safety Engineering Practices Essi Immonen, Joonas Linnosmaa, Atte Helminen, and Jarmo Alanen | 1026 |
| 462 | A Monte Carlo Uncertainty Propagation on the Accident Rate of a Plant Equipped with a Single Protection Channel Considering Truncated Probability Distributions E. P. M. Araújo, M. C. Martins, D. G. Teixeira, and P. F. Frutuoso e Melo | 1034 |
| 464 | Failure Modes Analysis of the Electrical Power Supply for the GEMINI+ High Temperature Gas-Cooled Reactor <i>Mina Torabi and Karol Kowal</i> | 1041 |
| 469 | Study of the Impact of Obsolescence on the Reliability of Nuclear Power Plant Safety Equipment Isabel Martón, Ana I. Sánchez, Sara Asensio, Victoria Caro, José Felipe Villanueva, Sofia Carlos, and Sebastián Martorell | 1049 |
| 474 | Comparison between Non-Parametric and Parametric Tolerance Intervals. Application to the Uncertainty Analysis of a LBLOCA Ana I. Sánchez, José Felipe Villanueva, Sebastián Martorell, Sofia Carlos, and Isabel Martón | 1055 |
| 502 | Study of the Cooling Conditions through the Secondary of a Steam Generator using a Mobile Pump in an Extended SBO Joé Ordóñez, Jose Felipe Villanueva, Sofía Carlos, Sebastián Martorell, Isabel Martón, Ana Sánchez, Rafael Mendizábal, and Javier Ramón | 1061 |

| 530 | Challenges in Evidence Evaluation and Decision-Making Regarding D I&C Systems in Safety Demonstration in the Nuclear Industry Coralie Esnoul, Yonas Zewdu Ayele, and Rune Fredriksen | 1069 |
|-----|---|------|
| 020 | Improving the Reliability of Visual Inspections Conducted by Fire and Rescue Services During Pre-Incident Planning Visits Victor Hrymak | 1077 |
| 147 | Psychological Safety in Crisis Preparedness and Management Training Context Gunhild Birgitte Sætren, Hege Christin Stenhammer, June Borge Doornich, Jan-Oddvar Sørnes, and Mina Saghafian | 1085 |
| 202 | An Innovative Protocol to Assist Operators in the Safe use of Construction Machines Laura Tomassini, Luciano Di Donato, Marco Pirozzi, Cristiano Costa, Elisabetta d'Alessandri, Alessandra Ferraro, and Daniela Freda | 1092 |
| 596 | Status of ISO 45001:2018 Implementation in Seaports: A Case Study Isaac Animah and Mahmood Shafiee | 1100 |
| 618 | Assessment of Knowledge, Attitudes and Practices on Safe Disposal of Pharmaceutical Waste Among Pharmacy, Medical and Dental Interns at Windhoek and Katutura Central Hospitals in Namibia (2018 to 2019): A Quantitative Study Martha Chadyiwa, Stanslaus Madende, and Shinga Alifina Feresu | 1108 |
| 025 | Ontology Model Construction of Long-Distance Oil and Gas Pipeline Emergency Case Yiyue Chen, Laibin Zhang, Jinqiu Hu, Xiaowen Fan, and Mingyuan Wu | 1116 |
| 210 | Reliability Estimation of an LNG Bunkering Operation Supply. The BURI Antonio Miranda, Sebastián Martorell, Isabel Martón, and Ana Isabel Sánchez | 1124 |
| 299 | Changes in Framework Conditions in the Norwegian Petroleum Industry: What Are Their Relations to Safety? Trond Kongsvik and Hanne Finnestrand | 1132 |
| 405 | Hydrocarbons Storage Tanks: Technical Evaluations Related to Major Accident Safety Fausta Delli Quadri and Genève Farabegoli | 1140 |
| 513 | Aspects of NaTech Risk Assessment for the Underground Storage of Natural Gas Simonetta Campana, Romualdo Marrazzo, Cosetta Mazzini, and Liliana Panei | 1148 |
| 401 | Learning From Fire Incidents – Analysis of a devastating fire in a building with municipal housing in Norway Edvard Aamodt, Anne Steen-Hansen, and Ole Anders Holmvaag | 1156 |
| 068 | Enabling Safety Training: Facilitating Learning in Post-Simulation Debriefing of Maritime Officers Aud M. Wahl and Anniken Solem | 1164 |
| 096 | Probing Elements of Safety Culture in Engineering Students: Exploratory Analysis and Preliminary Results Rachael Thompson Panik, AICP, Hamidreza Nazemi, Joseph Homer Saleh, Brian Fitzpatrick, and Patricia L. Mokhtarian | 1172 |
| 166 | Validation Methodology for Assessment of New ENavServices Dag Atle Nesheim, Marius Imset, and Kay Endre Fjørtoft | 1180 |

| 344 | Do Different Ways of Organizing Outage Work have Implications for Situation Awareness? Empirical Insights from a Case Study Kine Reegård, Espen Nystad, and Robert McDonald | 1188 |
|-----|---|------|
| 407 | Improving Learning by Adding the Perspective of Success to Event Investigations Elizabeth Solberg and Rossella Bisio | 1196 |
| 051 | A Load Allocation Strategy for Stochastically Deteriorating Multi-Stack PEM Fuel Cells <i>Jian Zuo, Catherine Cadet, Zhongliang Li, Christophe Bérenguer, and Rachid Outbib</i> | 1204 |
| 057 | Usage Data Analysis of Lithium-Ion Batteries as a Base for the Prediction of the Product Reliability in a Specific Second Life Application Lea Hannah Guenther, Pit Fiur, and Stefan Bracke | 1212 |
| 072 | Failure Mode and Observability Analysis (FMOA): An FMEA-based Method to Support Fault Detection and Diagnosis Renan Favarão da Silva, Arthur Henrique de Andrade Melani, Miguel Angelo de Carvalho Michalski, and Gilberto Francisco Martha de Souza | 1220 |
| 073 | Remaining Useful Life Estimation Based on an Adaptive Approach of Autoregressive Integrated Moving Average (ARIMA) Miguel Angelo de Carvalho Michalski, Arthur Henrique de Andrade Melani, Renan Favarão da Silva, and Gilberto Francisco Martha de Souza | 1227 |
| 074 | Data Driven Fault Detection in Hydroelectric Power Plants based on Deep Neural Networks Tiago Gaspar da Rosa, Arthur Henrique de Andrade Melani, Fabio Norikazu Kashiwagi, Miguel Angelo de Carvalho Michalski, Gilberto Francisco Martha de Souza, Gisele Maria de Oliveira Salles, and Emerson Rigoni | 1235 |
| 078 | Erosion State Estimation for Subsea Choke Valves Considering Valve Openings Xingheng Liu and Jørn Vatn | 1243 |
| 121 | Performance Evaluation of Neural Network Architectures on Time Series Condition Data for Remaining Useful Life Prognosis Under Defined Operating Conditions Fabian Mauthe, Marcel Braig, and Peter Zeiler | 1251 |
| 170 | Atmospheric Corrosion Prognostics Using a Particle Filter Luc S. Keizers, Richard Loendersloot, and Tiedo Tinga | 1259 |
| 265 | A Deep Learning Approach for Control Chart Patterns (CCPs) Prediction Tuan Le, Hai-Canh Vu, Nassim Boudaoud, Zohra Cherfi-Boulanger, Amelie Ponchet Durupt, and Ho-Si-Hung Nguyen | 1267 |
| 270 | Methodology for Accelerated Tests of Electronic Elements Based on Multifactor Stress Zdenek Vintr and Anh Dung Hoang | 1275 |
| 280 | Rapid Damage Assessment and Monitoring of Bridge Recovery After a Mediterranean Hurricane Marianna Loli, John Manousakis, Stergios A. Mitoulis, and Dimitrios Zekkos | 1283 |
| 325 | Deep Gaussian Mixture Model – A Novelty Detection Method for Time Series Stefan Brunner, Carmen Mei-Ling Frischknecht-Gruber, Monika Reif, and Christoph Walter Senn | 1291 |

| 482 | Deterioration Modeling of Sewer Pipes via Discrete-Time Markov Chains: A Large-Scale Case Study in the Netherlands Lisandro A. Jimenez-Roa, Tom Heskes, Tiedo Tinga, Hajo J. A. Molegraaf, and Mariëlle Stoelinga | 1299 |
|-----|---|------|
| 495 | A Learning Approach for Remaining Useful Lifetime Prognosis of Stochastically Deteriorating Feedback Control Systems Yufei Gong, Khac Tuan Huynh, Yves Langeron, and Antoine Grall | 1307 |
| 509 | Further Analysis of a Circular Metal Sawing Process Dominik Brüggemann, Christoph Rosebrock, and Stefan Bracke | 1315 |
| 555 | Fault Diagnosis of Power Transformers Based on Machine Learning Approaches Hadis Hesabi, Thierry Jung, Mustapha Nourelfath, and Sofiane Achiche | 1323 |
| 598 | Monitoring and Analysis of Electric Motor Amperage Towards Detection of Future Motor Failures Konstantinos Chairetakis, Sarantis Kotsilitis, and Effie Marcoulaki | 1330 |
| 603 | Monitoring Degradation of Insulated Gate Bipolar Transistors in Induction Cooktops by Artificial Neural Networks Chenyang Lai, Piero Baraldi, Ibrahim Ahmed, Enrico Zio, Alejandro Del Cueto, Javier Gil, and Sergio Llorente | 1338 |
| 604 | An Unsupervised Method for Anomaly Detection in Multi-Stage Production Systems Based on LSTM Autoencoders Fatemeh Hosseinpour, Ibrahim Ahmed, Piero Baraldi, Mehdi Behzad, Enrico Zio, and Horst Lewitschnig | 1346 |
| 629 | Analysis of Time Series Imaging Approaches for the Application of Fault Classification of Marine Systems Christian Velasco-Gallego and Iraklis Lazakis | 1353 |
| 655 | Optimization of Feature Learning for Calculating Remaining Useful Life Monisha Srihari, Zahra Gholipour, Reza Khoshkangini, and Abbas Orand | 1363 |
| 658 | Solar PV Panel Degradation Modeling and Maintenance Planning Yaxin Shen, Mitra Fouladirad, and Antoine Grall | 1371 |
| 659 | Performance Analysis for a Degrading System with Markov Model Aibo Zhang, Zhiying Wu, Yukun Wang, and Min Xie | 1379 |
| 242 | Asset Management Modelling Approach Integrating Structural Health Monitoring Data for Composite Components of Wind Turbine Blades Wen Wu, Ali Saleh, Rasa Remenyte-Prescott, Darren Prescott, Manuel Chiachio Ruano, and Dimitrios Chronopoulos | 1385 |
| 601 | Data-driven Model Generation Process for Thermal Monitoring of Wind Farm Main Components through Residual Indicators Analysis Théodore Raymond, Alexis Lebranchu, Christophe Bérenguer, and Sylvie Charbonnier | 1393 |
| 155 | Assessment of Satisfactory Recovery Level after Disaster using Probabilistic Modeling of Residents' Behavior: Case of Residential Electricity Demand Lubashevskiy Vasily | 1401 |

| 206 | Integration Between Data-Driven Process Simulation Models and Resilience Analysis to Improve Environmental Risk Management in the Waste-to-Energy Industry Nicola Tamascelli, Alessandro Dal Pozzo, Yiliu Liu, Valerio Cozzani, and Nicola Paltrinieri | 1409 |
|-----|--|------|
| 456 | Towards the Prediction of Resilience: An Equation-based Resilience Representation Tobias Demmer, Jens Kahlen, Daniel Lichte, and Kai-Dietrich Wolf | 1417 |
| 007 | Risk Analysis in Purified Water Projects Using the Analytical Hierarchy Process and Decision Tree – A Case Study J. C. Pereira and F. Almeida | 1425 |
| 577 | Development of an Evaluation and Decision Support Method for Food Safety Management along the Supply Chain Maria Alejandra Restrepo Mejia, Gianfranco Camuncoli, Salvina Murè, Eleonora Pilone, Shuo Yang, and Micaela Demichela | 1433 |
| 393 | Analyzing Hazards in Process Systems Using Multilevel Flow Modelling: Challenges and Opportunities Ruixue Li, Jing Wu, Ole Ravn, and Xinxin Zhang | 1441 |
| 569 | Rapid Fuzzy Logic Flood Risk Assessment for the Archival Heritage Gabriele Baldissone, Micaela Demichela, Antonello Barresi, Davide Fissore, and Francesca Bosco | 1449 |
| 258 | An Integrated Framework for Incorporating Climate Risk into Urban Land-Use Change Modeling Nazli Yonca Aydin, Supriya Krishnan, Hongxuan Yu, and Tina Comes | 1455 |
| 574 | Territorial Representation of a Vulnerability Associated with the Seveso Installations in a Nord Italian Case Study David Javier Castro Rodriguez, Simone Beltramino, Mattia Scalas, Eleonora Pilone, and Micaela Demichela | 1463 |
| 039 | What Are the Core Principles of Risk Management? Terje Aven, Azadeh Seif, and Konstantina Karatzoudi | 1471 |
| 124 | The Development of a Holistic IT Platform for Major Risk Assessment and Management: The MIRA Tool Emmanuel Plot, Maria Chiara Leva, Ludovic Moulin, Vassishtasaï Ramany B.P., Philippe Decamps, and Frederic Baudequin | 1479 |
| 214 | Adoption Level of Near-Miss Management Systems in the Industrial Sector: An Exploratory Survey Maria Grazia Gnoni, Fabiana Tornese, Diego de Merich, Armando Guglielmi, Mauro Pellicci, Guido Micheli, and Gaia Vitrano | 1488 |
| 532 | Outline of a Risk Management Framework for Future Transport Systems Surbhi Bansal, Surbhi Bansal, Roger Flage, Henrik Bjelland, Anders Jensen, and Willy Røed | 1494 |
| 305 | The Relevance of Good Practices to Improve Disaster Risk Management in Multi-Hazard Risk Scenarios in the Field of Civil Protection Boris Petrenj, Francesca Capone, Claudia Morsut, Daniela Di Bucci, and Maria Polese | 1502 |

| 400 | Public Administration, Reliability and Innovation – Learnings From a Municipal Pandemic Management Case Study Haavik Torgeir Kolstø, Antonsen Stian, Gjøsund Gudveig, and Aasen Tone Merethe | 1510 |
|-----|---|------|
| 480 | Risk and Uncertainty in the COVID-19 Pandemic – An Empirical Contribution to Risk Science Stian Antonsen, Torgeir Haavik, and Gudveig Gjøsund | 1518 |
| 488 | On the Use and Value of Risk Assessment for Strengthening the Response to the Covid-19 Pandemic Alexander Cedergren and Henrik Hassel | 1526 |
| 246 | An Analytic Approach to Analyze a Defense-in-Depth (DiD) Effect as proposed in IT Security Assessment Thomas Termin, Daniel Lichte, and Kai-Dietrich Wolf | 1534 |
| 269 | An Approach to the Consideration of Uncertainties in Cost-Benefit Optimal Design of Physical Security Systems Dustin Witte, Daniel Lichte, and Kai-Dietrich Wolf | 1542 |
| 394 | Development of Equipment Fragility Models to Support the Security Management of Process Installations G. Marroni, G. Landucci, F. Tamburini, A. Bartolucci, S. Kuipers, W. Broekema, and V. Casson Moreno | 1550 |
| 457 | Study on the Risk Assessment of Terrorist Attacks at MICE Events and Countermeasures for Prevention Tingting Luan, Hongru Li, Yanfan Zhou, and Li Tao | 1557 |
| 642 | Dependency Graph Modularization for a Scalable Safety and Security Analysis Rhea C. Rinaldo and Dieter Hutter | 1565 |
| 086 | Application of Collaborative Governance and Integrated Risk-Resilience-Based Policies to Improve the Risk Management of Smart City Lighthouse Projects Konstantina Karatzoudi and Terje Aven | 1573 |
| 268 | Smart Technologies for Integrated NaTech Risk Management in Major Hazard Industrial Plants Alessandra Marino, Anna Carmela Lio, and Mariano Ciucci | 1581 |
| 292 | Safety Risk Analysis of Train Obstacle Detection System Based on Bayesian Network Weina Song, Fei Yan, and Peng Wang | 1587 |
| 487 | Development of the Risks from the Design of the E-LAND Solution to the Implementation Coralie Esnoul and Bjørn Axel Gran | 1594 |
| 084 | First-Passage Reliability Analysis for High-Dimensional Nonlinear Systems via Physically Driven Globally-Evolving-Based Generalized Density Evolution Equation Meng-Ze Lyu and Jian-Bing Chen | 1601 |
| 165 | Probabilistic Approach for Concrete Structures Exposed to Combined Carbonation-chloride-induced Corrosion P. Claude, F. Duprata, T. de Larrarda, J. Mai-Nhub, P. Rougeaub, L. Marraccic, and P. Guédon | 1609 |

| 239 | Parametric Studies on Random Field Realisations of Glacial Soils using the Fast Fourier Transform Samzu Agbaje, Edoardo Patelli, and Xue Zhang | 1617 |
|-----|--|------|
| 395 | Situated Risk Integration with 3D-BIM: Design and User Evaluation Insights Morten Gustavsen, Lucas Stephane, Ole Jakob Ottestad, and Robert Ganz | 1625 |
| 358 | New Two Phases Distribution model for Modelling of Failures Caused by a Change in Material Property Franz-Georg Neupert and Stefan Bracke | 1633 |
| 054 | Pitfalls of Zero Failure Testing for Reliability Demonstration Martin Dazer, Alexander Grundler, Achim Benz, Marco Arndt and Philipp Mell | 1639 |
| 067 | Performance Assessment of Redundancy Strategies of Systems Subject to External Shocks Emefon Ekerette Dan and Yiliu Liu | 1647 |
| 174 | A Fast Method for Enumerating all Minimal Cut-sets in a Network with Links and Nodes Failures Jacek Malinowski | 1655 |
| 229 | Maintenance of a Parallel System using the State-Dependent-Mean-Residual Time Lucía Bautista, Inma T. Castro, and Reza Ahmadi | 1662 |
| 375 | Exact and Asymptotic Results for the Availability of Connected (2,2)-out-of-():F Lattice Systems Jacek Malinowski and Christian Tanguy | 1668 |
| 409 | Using Random Step-Stress Models to Analyze the Reliability of Systems with Hidden Failure of Control Subsystems: Cases of Tampered Hazard Rate Model and General Cumulative Exposure Model Vincent Couallier | 1676 |
| 669 | Probability Based Estimation of Reliability Indices in Power Systems Nikola Veljanovski and Marko Čepin | 1684 |
| 093 | Integrating Component Condition in Long-Term Power System Reliability Analysis Håkon Toftaker and Iver Bakken Sperstad | 1691 |
| 617 | A New Method for Multi-State System Reliability Analysis based on Uncertain Data and Its Application in the Medical Domain Elena Zaitseva, Vitaly Levashenko, Jan Rabcan, and Miroslav Kvassay | 1699 |
| 653 | Experimental Analysis of Decision Diagrams Used to Represent Structure Functions of Series-Parallel Multi-State Systems Michal Mrena and Miroslav Kvassay | 1707 |
| 109 | Availability Analysis of a Cargo Vessel as an Integrated Subset of Systems Thomas Markopoulos and Agapios N. Platis | 1715 |
| 143 | Operations Error Analysis of the Use of Electronic Chart Display and Information System (ECDIS) J.R. Taylor and I. Kozine | 1723 |

| 226 | Modelling the Dependability of an Offshore Desalination System Using the Universal Generating Function Technique Panagiotis M. Psomas, Ioannis Dagkinis, Agapios N. Platis, and Vasilis P. Koutras | 1731 |
|-----|--|------|
| 150 | Reliability Model of an Automatically Switching Radon Exposimeter for System Design Evaluation Thomas Gwosch, Julian Peters, Johanna Pehlivan, and Christian Naber | 1739 |
| 047 | Comparison of Hose and Arm Leak Frequencies John Spouge | 1747 |
| 223 | Methodology for Subsea Component Reliability Data Collection According to International References: Learnings and Challenges Lima, E. N., Carvalho, L. A. P., Macedo, B. V. M., Mendes, R. F., Naegeli, G. S. T., and Colombo, D. | 1755 |
| 369 | Effective Application of Design for Reliability in New Product Development Pankaj Shrivastava and Desiderio Rodrigues | 1760 |
| 420 | A Novel Approach to Well Barrier Survival Analysis using Machine Learning Danilo Colombo, Gilson Brito Alves Lima, João Paulo Papa, Leandro Aparecido Passos, and Marcos Cleison Silva Santana | 1767 |
| 448 | Proposal of a Test Protocol for Reliability Evaluation of O&G Equipment Eduardo Menezes, Rafael Azevedo, Caio Souto Maior, Márcio Moura, Isis Lins, Manoel Feliciano da Silva, and Marcos Vinicius Nóbrega | 1775 |
| 501 | The use of Weibull-GRP Virtual Age Model for Addressing Degradation due to Demand Induced Stress in Reliability Analysis of On-demand Systems Rafael Azevedo, Márcio Moura, Isis Lins, July Macêdo, Caio Maior, Manoel da Silva, and Marcos Nobrega | 1782 |
| 508 | Analysis of Compromising Operational Conditions for Intelligent Completion using Digital Twin Márcio Moura, Eduardo Menezes, Isis Lins, Manoel Feliciano da Silva, and Marcos Vinicius Nóbrega | 1788 |
| 512 | Fatigue-Life Assessment under Random Loading Conditions using a Calibrated Numerical Model and Monte Carlo Samplings Caio B. S. Maior, Eduardo Novaes, Márcio C. Moura, Isis D. Lins, Manoel F. da Silva, and Marcus V. C. Magalhães | 1794 |
| 540 | Reliability-based Guidelines for Elaborating Technical Specifications of New Technologies João Mateus Santana, Caio Souto Maior, Isis Lins, Márcio Moura, Rafael Azevedo, Eduardo Menezes, David Martins, Feliciano da Silva, and Marcus Vinicius Magalhães | 1801 |
| 543 | PetroBayes: An Effortless Software to Perform Bayesian Reliability Estimation João Mateus Santana, Beatriz Cunha, Diego Aichele, Rafael Azevedo, Márcio das Chagas Moura, Caio Maior, Isis Lins, Renato Mendes, Everton Lima, and Enrique Droguett | 1806 |
| 557 | Using a Part Stress-Based Model to Assess the Coverage Factor of Partial Tests of Blowout Preventer for Test Scheduling Optimization | 1813 |

Luciano Machado de Almeida, Danilo Colombo, and Rodolfo Cardoso

| 623 | Long Short-Term Memory ANNs for Fast Assessment of Injection Policies of Water-Flooding in Oil and Gas Reservoirs Guido Di Federico, Ahmed Shokry, Enrico Zio, Giorgio Fighera, and Emanuele Vignati | 1821 |
|-----|---|------|
| 032 | Multi-Agent Maintenance Scheduling of Generation Unit in Electricity Market Using Safe Deep Reinforcement Learning Algorithm Pegah Rokhforoz and Olga Fink | 1829 |
| 066 | Using Artificial Intelligence Algorithms to Identify Factors of Methane Leaks from Gas Transmission Assets Amel Belounnas, Florent Brissaud, and Elodie Rousset | 1837 |
| 080 | Wavelet-based Noise Extraction for Anomaly Detection Applied to Safety-Critical Electronics at CERN Felix Waldhauser, Hamza Boukabache, Daniel Perrin and Martin Dazer | 1844 |
| 389 | Uncertainty Quantification Over Spectral Density Estimation for Strong Motion Process with Missing Data Yu Chen, Edoardo Patelli, Ben Edwards, Michael Beer, and Jaleena Sunny | 1852 |
| 567 | Structural Reliability Assessment of Offshore Wind Turbine Supports by Combining Adaptive Kriging and Artificial Neural Network Chao Ren, Younes Aoues, Didier Lemosse, and Eduardo Souza de Cursi | 1859 |
| 619 | Wrapper Selection of Features for Fault Diagnostics of Truss Structures Mohammad N. Juybari, Piero Baraldi, Antonio Palermo, Ali Eftekhari Milani, Alessandro Marzani, and Enrico Zio | 1867 |
| 645 | Contrastive Feature Learning for Railway Infrastructure Fault Diagnostic Katharina Rombach, Gabriel Michau, Kajan Ratnasabapathy, Lucian-Stefan Ancu, Wilfried Bürzle, Stefan Koller, and Olga Fink | 1875 |
| 146 | Deciding How to Decide under Uncertainty: A methodology Map to Address Decision-making under Uncertainty Amirreza Kandiri, Rui Teixeira, and Maria Nogal | 1882 |
| 164 | Asset Management From Cradle to Grave in a Single Software: The use of ILIAS by Belgian Defence Ariane Iradukunda, Pieter-Jan Zwaan, and Nicolas Boutet | 1890 |
| 221 | Comparative Assessment of Models of Cascading Failures in Power Networks Under Seismic Hazard Hugo Rosero-Velásquez, Juan Camilo Gómez-Zapata, and Daniel Straub | 1897 |
| 249 | Simulation Supported Bayesian Network Approach for Performance Assessment of Infrastructure Systems Mohsen Jafari Songhori, Claudia Fecarotti, and Geert-Jan van Houtum | 1905 |
| 253 | Modeling and Evaluating the Impact of Natural Hazards on Communities and their Recovery Neetesh Sharma, Armin Tabandeh, Paolo Gardoni and Colleen Murphy | 1913 |
| 583 | Assessing the Quality of Comparative Studies in the Asset Management and Safety Domain – Basics of Best Practices Conceptualization Syed Taha, Ove Njå, and Jawad Raza | 1921 |

| 013 | Risk Assessment in Ultrasonic Testing of Critical Parts via Bayesian Belief Networks and Analytic Hierarchy Process Italo de Souza Oliveira, José Cristiano Pereira, Alexandre Magno Ferreira de Paula, and Luiza Carneiro Pizzi | 1928 |
|-----|---|------|
| 058 | Reliability Demonstration of the Entirety of Cells from a High-Voltage Battery Using Prior Knowledge of Degradation Simulations Marcel Göldenboth, Alexander Grundler, and Martin Dazer | 1936 |
| 296 | Prediction of the Luminous Flux Degradation of Light Emitting Diodes with an Interval Regressions Model Roberto Rocchetta, Zhuozhao Zhan, and Alessandro Di Bucchianico | 1944 |
| 359 | Hyperspectral Imaging of Steel to Assess Corrosion Severity in a Remote Inspection Regime Bahman Raeissi and Torbjørn Skramstad | 1952 |
| 538 | A Simulation-based Bayesian Approach for Parameter Estimation with Model Misspecification Analysis using ALT Data Mohamed Rabhi, Anis Ben Abdessalem, Laurent Saintis, and Laurent Saintis | 1960 |
| 621 | Prediction of the Remaining Useful Life of MOSFETs Used in Automotive Inverters by an Ensemble of Neural Networks Giovanni Floreale, Piero Baraldi, Enrico Zio, Carlo Cecati, Concettina Buccella, Stefano Galeazzi, Francesco Barcio, and Carlo Tieri | 1968 |
| 186 | Approvable AI for Autonomous Ships: Challenges and Possible Solutions Brian Murray, Ørnulf Jan Rødseth, Håvard Nordahl, Lars Andreas Lien Wennersberg, Armin Pobitzer, and Henrik Foss | 1975 |
| 271 | Data Extraction and Deep Learning Method for Predictive Maintenance in Vessel's Engine Room Cédric Seguin, Yohann Rioual, Jean-Philippe Diguet, and Guy Gogniat | 1983 |
| 290 | Adversarial Active Testing for Risk-Based Al Assurance Fan Wu, Qian Wei, and Yanwei Fu | 1991 |
| 413 | Safe Reduction of Conservatism by Combining Machine Learning and Physics-based Models Simen Eldevik, Carla Ferreira, Christian Agrell, Sindre Olsen Skrede, Erling Katla, Marie Lindmark Sandøy, and Per Jørgen Dahl Svendsen | 1999 |
| 429 | Safety of Autonomous Ships – Uncertainty Quantification of Deep Neural Networks for Computer Vision Christian Agrell and Erik Stensrud | 2007 |
| 449 | Natural Language Processing of Aviation Occurrence Reports for Safety Management Patrick Jonk, Vincent de Vries, Rombout Wever, Georgios Sidiropoulos, and Evangelos Kanoulas | 2015 |
| 450 | Interpretable Prognostics and Health Management Through Counterfactual Generation Joaquín Figueroa Barraza, Enrique López Droguett, and Marcelo Ramos Martins | 2024 |

| 514 | Exploring Kernel Based Quantum Machine Learning for Prognosis and Health Management Applications Gabriel San Martín Silva, and Enrique López Droguett | 2031 |
|-----|---|------|
| 529 | LSTM based Condition Monitoring of Fine Grinded Surfaces Marcin Hinz, Jannis Pietruschka, and Stefan Bracke | 2039 |
| 015 | A Markov-based Bridge Maintenance Optimization Model Considering User Costs Tianqi Sun and Jørn Vatn | 2047 |
| 017 | Evaluating Non-Functional Qualities in Railway by Applying the Quality Triage Method – A Case Study Eivind H. Okstad, Ola Løkberg, and Robert Bains | 2055 |
| 030 | Measures for Tunnel Safety Management Dana Prochazkova, Jan Prochazka, Jana Viktorie Martincova, and Tomas Kertis | 2063 |
| 049 | Safe Circulation of Pedestrians and Cyclists at Roadworks Isabelle Roche Cerasi, Trond Foss, Hampus Karlsson, and Dagfinn Moe | 2071 |
| 106 | Change in Self-reported Cycling Habits, Safety Assessments, and Accident Experience in Norway over the Last Decade An-Magritt Kummeneje and Isabelle Roche-Cerasi | 2079 |
| 122 | Fatigue Risk Management: Current Practices and Challenges, Further Learning Ishbel Macgregor-Curtin, Nora Balfe, and Maria Chiara Leva | 2087 |
| 141 | Railway Safety Development in the Czech Republic, Recent Accidents and Lesson Learnt Tomas Kertis, Dana Prochazkova, and Radek Rehak | 2097 |
| 245 | Operational Design Domain or Operational Envelope: Seeking a Suitable Concept for Autonomous Railway Systems Abhimanyu Tonk and Abderraouf Boussif | 2104 |
| 254 | Identification of Human Driver Critical Behaviors and Related Reliability Evaluation in Real Time Chao He and Dirk Söffker | 2112 |
| 294 | Statistical Model Checking for On-board Train Integrity Safety and Performance Analysis Insaf Sassi, Mohamed Ghazel, and El-Miloudi El-Koursi | 2120 |
| 361 | A Framework for Risk-Awareness and Dynamic Risk Assessment for Autonomous Trains Mohammed Chelouati, Abderraouf Boussif, Julie Beugin, and El-Miloudi El Koursi | 2128 |
| 418 | Semi-Automated Generated Bowtie Diagrams for Optimizing Safety Analysis in the Railway Infrastructure Grethe Lillehammer, Morten Gustavsen, and Geert van Loopik | 2136 |
| 446 | Toward Usable Formal Models for Safety and Performance Evaluation of ERTMS/ETCS Level 3: The PERFORMINGRAIL Project Rim Saddem-Yagoubi, Muhammad Usman Sanwal, Simone Libutti, Massimo Benerecetti, Julie Beugin, Francesco Flammini, Mohamed Ghazel, Bob Janssen, Stefano | 2143 |

| | Marrone, Fabio Mogavero, Roberto Nardone, Adriano Peron, Cristina Seceleanu, and Valeria Vittorini | |
|-----|---|------|
| 470 | SAFETY4RAILS Information System Platform Demonstration at Madrid Metro Simulation Exercise Stephen Crabbe, Katharina Roß, Corinna Köpke, Katja Faist, Eduardo Villamor Medina, Uli Siebold, Eros Cazzato, Anett Mádi-Nátor, Eli Ben-Yizhak, Ido Peled, Alper Kanak, Niyazi Ugur, S.Halit Ergun, Salih Ergun, Marco Tiemann, Marie-Hélène Bonneau, Kaci Bourdache, Jari Savolainen, Stelios C. A. Thomopoulos, Christos Kyriakopoulos, Konstantinos Panou, Antonio De Santiago Laporte, Emmanuel Matsika, Raphael David, Emiliano Costa, Giulia Siino, Sujeeva Setunge, Mojtaba Mahmoodian, Nader Naderpajouh, Davide Ottonello, Tatiana Silva, Alejandro Prada, Andreas Georgakopoulos, Eleni Giannopoulou, Michalis Mitrou, Vera Stavroulaki | 2151 |
| 565 | Women's Perspective of Personal Safety on Public Transport in Ireland Ajeni Ari, Joseph Mietkiewicz, Maria Chiara Leva, Lorraine D'Arcy, and Mary Kinahan | 2159 |
| 298 | Reforming the Customs Officer Education in Norway. Balancing Formal Education and Deep Knowledge Christian Henrik Alexander Kuran | 2168 |
| 639 | To What Extent is the ISPS Code Relevant for Mitigating Current and Future Security Threats Along the Norwegian coastline? Lillian K. Stene and Richard Utne | 2175 |
| 153 | Organizational Resilience Estimation: Application of Expert Judgment Adel Mottahedi, Ali Nouri Qarahasanlou, and Abbas Barabadi | 2183 |
| 176 | Intervention Grouping Strategy for Multi-component Interconnected Systems: A Scalable Optimization Approach Omar Kammouh, Ahmadreza Marandi, and Claudia Fecarotti | 2191 |
| 179 | A multi-fidelity Framework for Operational Adaptation of Engineering Systems Rui Teixeira, Beatriz Martinez-Pastor, Maria Nogal, and Alan O'Connor | 2199 |
| 205 | A Simulation-Based Methodology to Assess Resilience Enhancing Interventions for Transport Systems: A Retention Basin Example Hossein Nasrazadani, Bryan Adey, Saviz Moghtadernejad, and Alice Alipour | 2207 |
| 444 | A Safety-Based Resilience Quantification Framework for Safety Critical Systems Santhosh T. V., Edoardo Patelli, and Gopika V. | 2215 |
| 484 | Towards a New Seismic Short-Term Prediction Methodology for Critical Service Operators and Manufacturing Companies Against Earthquake Vadim Bobrovskiy, Paolo Trucco, and Alexey Kaplin | 2223 |
| 608 | Transportation Resilience Optimization at the Pre-event Stage by using an Integrated Computable General Equilibrium Model Tingting Zhang, Chence Niu, Divya Jayakumar Nair, and Vinayak V. Dixit | 2230 |
| 255 | Situated and Personalized Monitoring of Human Operators During Complex Situations Chao He, Abderahman Bejaoui, and Dirk Söffker | 2238 |
| 308 | A Guided Tour of AltaRicaWizard, the AltaRica 3.0 Integrated Modeling Environment Michel Batteux, Tatiana Prosvirnova, and Antoine Rauzy | 2246 |

| 527 | A Road Map for Digital Transformation in Maintenance Adolfo Crespo Márquez | 2254 |
|-----|---|------|
| 539 | Approaches to Utilize Digital Twins in Safety Demonstration and Verification of Automated and Autonomously Controlled Systems Raffael Wallner and Mary Ann Lundteigen | 2263 |
| 075 | Cluster Analysis on Dynamic Event Trees using the Restructured Software Tool MCDET Jan Soedingrekso, Tanja Eraerds, Martina Kloos, Jörg Peschke, and Josef Scheuer | 2271 |
| 085 | Implications of Cybersecurity on Safety of New Machineries to Mitigate Human-Robot Collaboration Risks Sara Anastasi, Marianna Madonna, Mario Di Nardo, Mauro Platania, and Luigi Monica | 2279 |
| 173 | The Maintenance in Industry 4.0: Assistance and Implementation Mario Di Nardo, Liberatina Carmela Santillo, Silvia Carra, Luigi Monica, Anastasi Sara, and Maryam Gallab | 2286 |
| 211 | A Teaching Framework for Safety and Reliability of Robotic and Automation Systems Jing Wu and Xinxin Zhang | 2293 |
| 247 | Implementation of Computer Vision Using Intelligent Custom Object Detection to Improve Asset, Risk, and Safety Management Systems in Several Power Plant Budi Hidayat, Muchamad Jati Nugroho, Egga Bahartyan, and Rifky Raymond | 2301 |
| 274 | Security Implications of Social Robots in Public Space – A Systematic Literature Review Fabien Sechi and Yonas Zewdu Ayele | 2308 |
| 329 | Rare Event Probability Estimation through High-Dimensional Elliptical Distribution Modeling and Multiple Importance Sampling Marie Chiron, Christian Genest, Jérôme Morio, Sylvain Dubreuil, and Michel Salaün | 2316 |
| 412 | Digital Twins and Collaborative Robotics: A SWOT-AHP Analysis to Assess Sustainable Applications Giulio Paolo Agnusdei, Valerio Elia, Maria Grazia Gnoni, and Fabio Fruggiero | 2324 |
| 438 | The Human-Robot Interaction in the Perspective of the New Regulation on Machinery Products Marianna Madonna, Luigi Monica, and Sara Anastasi | 2330 |
| 646 | Using Cognitive Work Analysis to Deploy Collaborative Digital Twins : Application to Predictive Maintenance Naomi Kamoise, Clément Guérin, Mohammed Hamzaoui, and Nathalie Julien | 2336 |
| 102 | Current Status and Strategy for the Development of the Korean PSA Standard Joon-Eon Yang | 2344 |
| 114 | Design of Impact Tests for Polycarbonate Sheets and their Deterioration by Cooling Lubricants – Part 1: Models and Limitations of Measurement Heinrich Mödden and Nils Bergström | 2350 |
| 115 | Analysis of the Effect of cutting Fluids on the Impact Resistance of Polycarbonate Sheets by Means of a Hypothesis Test Eckart Uhlmann, Mitchel Polte, Nils Bergström, and Heinrich Mödden | 2358 |

| 160 | Survey on the way of Practice for Safety Demonstration of DI&C in Different Industries Xueli Gao and Bjørn Axel Gran | 2366 |
|-----|---|------|
| 193 | Ejection Test Requirements for Parts of Machine Tools: Part 1 Standardization Opportunities to Improve the State of the Art Luca Landi, Fabio Pera, Ernesto Del Prete, and Massimiliano Palmieri | 2374 |
| 194 | Ejection Test Requirements for Parts of Machine Tools: Part 2 Testing Energy Equivalence Hypothesis and Weak Points of Vision Panels Luca Landi, Fabio Pera, Giulia Morettini, Ernesto Del Prete, and Carlo Ratti | 2382 |
| 241 | On the New Acceptance Criteria in NORSOK D-010 for Plug and Abandonment of Wells Rune Vikane, Jon Tømmerås Selvik, and Eirik Bjorheim Abrahamsen | 2388 |
| 316 | New Risk Concept and the Public Governance of the Norwegian Petroleum Industry. What Enables or Inhibits the Practical Enforcement and Refinement of the Concept? Ole Andreas Engen, Marie Røyksund, Lisbet Fjæran, Marja Ylönen, and Jacob Kringen | 2396 |
| 402 | Standardizing Uncertainty: A Document Analysis Searching for the Role of Standardization in Transforming Uncertainty-based Risk Concepts Maja Joner Ognedal, Marius G. Vigen, Martin Inge Standal, Martin Rasmussen Skogstad, Kristine Vedal Størkersen, and Jan Hayes | 2404 |
| 433 | Proportionate Assurance of Smart Devices used in the UK Nuclear Industry Peter Bishop, Gareth Fletcher, Sofia Guerra, Silke Kuball, and Philippa Ryan Conmy | 2412 |
| 472 | Global Efforts Towards Establishing Safety Directives for Intelligent Systems: Review Carmen Mei-Ling Frischknecht-Gruber, Monika Reif, and Christoph Walter Senn | 2420 |
| 551 | An Innovative Smart System for the Safety of Workplaces with Mobile Machines with Remote Command Luca Catarinucci, Alessandra Ferraro, Roberto Gabbrielli, Luca Landi, Danilo Monarca, Andrea Motroni, Paolo Nepa, Luigi Patrono, and Marco Pirozzi | 2428 |
| 632 | Personal Exposure to Respirable Crystalline Silica Dust at Selected Coal Fired Power Stations in Bethal, Mpumalanga Province Martha Chadyiwa, Vuyazi Vinolia Mongwe, Emmanuel Emem-Obong Agbenyeku, Thokozani Mbonane, Phoka Rathebe, Shalin Bidassey-Manilal, Enireta Makanza, Bheki Magunga, and Claris Siyamayambo | 2436 |
| 647 | Design of Impact Tests for Polycarbonate Sheets and their Deterioration by Cooling Lubricants – Part 2: Proposals for Aging Period and Sample Size Heinrich Mödden | 2444 |
| 128 | A Simulation Method for Dynamic Risk Assessment of Uncertain Random System Lunhu Hu, Xing Pan, and Rui Kang | 2450 |
| 158 | Wildfire Risk Assessment and Management of Power Grids Tarannom Parhizkar, Saeed Nozhati, Ali Mosleh, and Jon Eric Thalman | 2458 |
| 172 | PERT-based Emergency Response Program for Fire Accidents of Electric Vehicles Mingjun Yin, Huixing Meng, and Xu An | 2467 |

| 182 | Prime Implicant Identification in the Dynamic Process of a Steam Generator Tube Rupture Scenario Tanja Eraerds, Martina Kloos, Joerg Peschke, Josef Scheuer, and Jan Soedingrekso | 2475 |
|-----|---|------|
| 452 | Research on Fire Risk Assessment Method of Automobile Exhibition Activities Based on Bayesian Network Tingting Luan, Lijia Zhang, Qinfei Xu, and Deyue Liu | 2483 |
| 630 | Model Based Software Engineering Techniques for Dynamic Reliability Assessment Valentin Rychkov and Claudia Picoco | 2491 |
| 167 | New methods at EDF R&D to do RAMS Analysis on Wind Farm Networks Carneiro de Sousa Humberto, Gey Maxime, Druet Jules, and Legendre Anthony | 2498 |
| 486 | Resilience Optimisation for Next Generation Drone Logistic Networks Gianluca Filippi, Edoardo Patelli, Massimiliano Vasile, and Marco Fossati | 2506 |
| 586 | A cybersecurity Approach for Improved System Resilience Ravdeep Kour, Amit Patwardhan, Ramin Karim, Pierre Dersin, and Jaya Kumari | 2514 |
| 880 | A Bayesian Approach to Determine the Minimum Detectable Damage Francesca Marsili, Filippo Landi, Alexander Mendler, and Sylvia Keßler | 2522 |
| 111 | Typology as a Deployment Tool for Digital Twins: Application to Maintenance in Industry Alexandre Blanchet, Nathalie Julien, and Mohammed Adel Hamzaoui | 2530 |
| 125 | Creating a Digital Twin Reliability Model Using RiskSpectrum ModelBuilder Gerben Dirksen, Dusko Kancev, Artem Shevchenko, Christine Bell, and Heiko Kollasko | 2538 |
| 180 | Interval-Based Global Sensitivity Analysis for Epistemic Uncertainty Enrique Miralles-Dolz, Ander Gray, Marco de Angelis, and Edoardo Patelli | 2545 |
| 243 | Assessing the Severity of Missing Data Problems with the Interval Discrete Fourier Transform Algorithm Marco Behrendt, Marco de Angelis, Liam Comerford, and Michael Beer | 2553 |
| 297 | Modelling Failures in Complex Systems with Profile-Based Stochastic Hybrid Automata Gaël Hequet, Nicolae Brînzei, and Jean-François Pétin | 2561 |
| 334 | Bounding Failure Probability with the SIVIA Algorithm Marco de Angelis, and Ander Gray | 2570 |
| 406 | Design of a Digital Twin of Gate Valves for Partial Stroke Testing Ludvig Björklund, Markus Glaser, Sebastian Imle, Gunleiv Skofteland, and Mary Ann Lundteigen | 2578 |
| 554 | Gradient Enhanced Physics-informed Neural Networks for Digital Twins of Structural Vibrations Tanmoy Chatterjee, Michael I. Friswell, Sondipon Adhikari, and Hamed H. Khodaparast | 2586 |
| 650 | Reliability Analysis of K-out-of-N System for Weibull Components Based on Generalised Progressive Hybrid Censored Data Subhankar Dutta and Suchandan Kayal | 2594 |

| 018 | Accident Risk Assessment for Solar Photovoltaic Manufacturing Matteo Spada, Gunnar Dickey, and Peter Burgherr | 2605 |
|-----|---|------|
| 019 | Preliminary Safety Assessment of PEM Fuel Cell Systems for Electrified Propulsion Systems in Commercial Aviation Stefan Kazula, Stefanie de Graaf, and Lars Enghardt | 2613 |
| 424 | A Multi-Criteria Decision Model for the Assessment of Sustainability and Governance Risks of Tailings Dams Peter Burgherr, Eleftherios Siskos, Christopher Mutel, Rebecca Lordan-Perret, and Matteo Spada | 2621 |
| 479 | Maritime Safety in the Era of Decarbonization: A Safety Barrier Analysis Nadhir Kahlouche, Serdar Yildiz, Anish Hebbar and Jens-Uwe Schröder-Hinrichs | 2629 |
| 494 | A Scenario based Threat Assessment using Bayesian Networks for a High Voltage Direct Current Converter Platform Babette Tecklenburg, Alexander Gabriel, and Frank Sill Torres | 2637 |
| 050 | Living Near Natural Hazards in the Age of Climate Change – The Relationship Between Expert and Local Knowledge in Risk Governance Stian Antonsen, Torgeir Haavik, Stig Andreas Johannessen, Jacob Taarup-Esbensen, and Bjørn Ivar Kruke | 2645 |
| 094 | Prioritizing Urban Shelters to Combat Flood Disasters with a Multidimensional Decision Model Nicolas Lennick Bomfim de Albuquerque, Lucas Borges Leal da Silva, Marcelo Hazin Alencar, and Adiel Teixeira de Almeida | 2653 |
| 154 | Potential Time Related Impacts of Turn-Over on Knowledge Continuity as Risk Perception in Longyearbyen, Svalbard Stig A. Johannessen | 2661 |
| 622 | Extreme Discharge Uncertainty Estimates for the River Meuse Using a Hierarchical Non-Parametric Bayesian Network Guus Rongen, Oswaldo Morales-Nápoles, and Matthijs Kok | 2670 |
| 634 | Evaluation of a Local Avalanche Forecasting System in Svalbard Knut Øien, Eirik Albrechtsen, Holt Hancock, and Martin Indreiten | 2678 |
| 055 | Towards Machine Learning Application for Safety in Confined Spaces: Creating an Incident Database Elena Stefana, Daniele Ghidoni, Federico Fanizza, Filippo Marciano, Paola Cocca, and Nicola Paltrinieri | 2686 |
| 130 | Improving the Reliability of Visual Inspections Conducted by Environmental Health and Safety Professionals, on a Hyperscale Data Centre Construction Site Alex A. Schouten and Victor Hrymak | 2694 |
| 209 | System Dynamics-Model for Industrial Human-Robot Interaction Safety Wouter M. P. Steijn, Coen van Gulijk, Teun Sluijs, and Dolf van der Beek | 2702 |
| 309 | Application of Lean Six Sigma Techniques to the Management and Maintenance of Special Lifting Equipment Marcello Braglia, Marco Frosolini, Roberto Gabbrielli, and Leonardo Marrazzini | 2710 |

| 625 | Conceptual Model for the Development of OHS Management in SMEs Georgi Hrenov | 2718 |
|-----|---|------|
| 112 | Victim Versus Offender: Behaviour Modelling During Covid-19 Pandemic Cyber Attacks Clara Maathuis and Sabarathinam Chockalingam | 2726 |
| 184 | Evaluation of Remain Useful Life Prediction Models from a Resilience Perspective <i>Jie Liu, Yiliu Liu, Shen Yin, and Jørn Vatn</i> | 2734 |
| 343 | Combining Cascading Effects Simulation and Resilience Management for Protecting CIs from Cyber-Physical Threats Sandra König, Lorcan Connolly, Stefan Schauer, Alan O'Connor, Páraic Carroll, and Daniel McCrum | 2741 |
| 425 | Identification of Vulnerabilities in Integrated Power-Telecommunication Infrastructures: A Simulation-based Approach Francesco Di Maio, Alessandro Stincardini, and Enrico Zio | 2749 |
| 564 | Grey-Box Models for Cyber-Physical Systems Reliability, Safety and Resilience Assessment Juan-Pablo Futalef, Francesco Di Maio, and Enrico Zio | 2757 |
| 195 | Application of a Generic Digital Twin for Risk and Resilience Assessment in Critical Infrastructures Stefan Schauer, Martin Latzenhofer, Sandra König, Sebastian Chlup, and Christoph Schmittner | 2765 |
| 213 | Evaluation of the Proposed European Commission Directive on Critical Entities Resilience and Its Potential to Consolidate the Resilience Terminology Arto Niemi and Frank Sill Torres | 2773 |
| 284 | Comparison of Resilience vs Traditional Probabilistic Safety Assessment for Nuclear Power Facilities Rundong Yan, Sarah Dunnett, and John Andrews | 2781 |
| 410 | Pumped-Hydro Potential to Enhance Power System Resilience Under Critical Gas Supply Interruptions Natalia Naval, Yassine Rqiq, and Jose M. Yusta | 2789 |
| 576 | Designing Protection Systems in Mountains for Reduced Maintenance Costs: Claret's Retention Dam Case Study Nour Chahrour, Guillaume Piton, Jean-Marc Tacnet, and Christophe Béerenguer | 2797 |
| 022 | Using Model-Based Safety Assessment to Define and Optimize Safety Integrated Functions MILCENT Frédéric | 2805 |
| 466 | Optimal Prescriptive Maintenance of Nuclear Power Plants by Deep Reinforcement Learning Zhaojun Hao, Francesco Di Maio, Luca Pinciroli, and Enrico Zio | 2812 |
| 505 | On Improving the Robustness of Reinforcement Learning Policies Against Adversarial Attacks Yesmina Jaafra, Christophe Bohn, Lucas Schott, Faouzi Adjed, Frédéric Pelliccia, and Mehdi Rezzoug | 2820 |

| 053 | A Risk Assessment Approach for IoT Enabled Transportation Infrastructure Subjected to Cyber-Physical Attacks Ntafloukas Konstantinos, Daniel P. McCrum and Liliana Pasquale | 2828 |
|-----|---|------|
| 289 | A Simulation-Driven Cyber Resilience Assessment for Water Treatment Plants Francesco Simone and Riccardo Patriarca | 2836 |
| 411 | Experience from Performing Controlled Technical Cyber Experiments on Critical Infrastructure as Hybrid Events John Eidar Simensen, Per-Arne Jørgensen, and Aleksander L. Toppe | 2844 |
| 521 | Assessing Cascading Effects of Cyber-Attacks in Interconnected Critical Infrastructures Sabarathinam Chockalingam and Clara Maathuis | 2852 |
| 641 | OODA Loop as a Decision Support Model to Continuous and Dynamic Vulnerability Management and Incident Response Management of Critical Infrastructures Erfan Koza | 2859 |
| 302 | Opportunity Analysis of the Machine Learning Technologies Application in VVER RP Safety Asses Mikhail Antipov, Maxim Uvakin, Aleksandr Nikolaev, Igor Makhin, and Evgeny Sotskov | 2867 |
| 306 | Probabilistic Artificial Intelligence Prediction of Material Properties for Nuclear Reactor Designs Adolphus Lye, Nawal Prinja, and Edoardo Patelli | 2874 |
| 380 | Comparison of Quantification Methods for Reflecting Limiting Conditions for Operation during Startup Operation of Nuclear Power Plants Jae Min Kim, Junyong Bae, and Seung Jun Lee | 2882 |
| 398 | A Deep Support Vector Data Description Model for Abnormality Detection and Application with Abnormality Classification in a Nuclear Power Plant Seung Gyu Cho and Seung Jun Lee | 2889 |
| 579 | A Grey-Box Digital Twin-based Approach for Risk Monitoring of Nuclear Power Plants Leonardo Miqueles, Ibrahim Ahmed, Francesco Di Maio, and Enrico Zio | 2897 |
| 676 | A Methodology for the Dynamic Risk Assessment of Nuclear Batteries Federico Antonello, Jacopo Buongiorno, and Enrico Zio | 2905 |
| 126 | Climate Change Impact Assessment on Railway Maintenance A.H.S. Garmabaki, Johan Odelius, Adithya Thaduri, Stephen Mayowa, Uday Kumar, Gustav Strandberg, and Javad Barabady | 2913 |
| 187 | Resilience-based Electric Sector Optimization in Response to Climate Change and Extreme Weather Conditions Rouzbeh Shirvani and Taranom Parhizkar | 2921 |
| 218 | Climate Risk Discourses and Risk Governance in Norway Claudia Morsut and Ole Andreas Engen | 2929 |
| 414 | Climatic Actions in Changing Climate for Structural Design Markova Jana, Sykora Miroslav, and Jung Karel | 2937 |
| 445 | Extreme Storm Surge Classification for Risk Assessment of Coastal Infrastructure Euan Macdonald, Enrico Tubaldi, and Edoardo Patelli | 2945 |

| 548 | Integrated Risk and Resilience Assessment for Critical Civil Infrastructures – A Case Study Proposal for Fire Risk in Northern Portugal Oscar Urbina Leal, Pilar Baquedano Juliá, Tiago Miguel Ferreira, Alexander Fekete, José C. Matos and Elisabete Teixeira | 2953 |
|-----|--|------|
| 615 | A Methodological Framework for the Resilience Analysis of Road Transport Networks Exposed to Freezing Rain Behrooz Ashrafi, Masoud Naseri, Francesco Di Maio, and Enrico Zio | 2961 |
| 092 | Risk Assessment in Fuel, Oil, and Chemicals Storage Facilities using Process Failure Mode Effects and Bayesian Believe Networks Aiming at Improving Reliability Marcio Delvô Mendes, José Cristiano Pereira, and Saulo Alessandro Marinho de Freitas | 2969 |
| 177 | Dynamic Bayesian Network-based Reliability Analysis of Deepwater Shear Ram Preventer Incorporating Process Demand Shengnan Wu, Qiao Zhang, Laibin Zhang, Yangfan Zhou, and Huanzhi Feng | 2977 |
| 674 | Bayesian Risk Assessment: On the Boundaries of Probabilistic Risk Assessment in the Risk-Based Inspection: An Alternative Approach BN-RBI Abdollah Kiani and Riana Steen | 2985 |
| 266 | Long-Term Prediction and Uncertainty Estimation for Multiple Parameters Using BiLSTM based CVAE with Attention Mechanism Hyojin Kim and Jonghyun Kim | 2993 |
| 465 | Collaborative Kernel-based Nonlinear Degradation Modeling with Transfer Learning for Remaining Useful Life Prediction Zhen Chen, Lanxiang Liu, Enrico Zio, and Ershun Pan | 3001 |
| 403 | Implications of 5G Connectivity on Mining Automation Safety Eetu Heikkilä, Timo Malm, Daniel Pakkala, Jere Backman, and Pekka Pääkkönen | 3009 |
| 493 | A Petri Net-based model to Study the Impact of Traffic Changes on 5G Network Resilience Rui Li, Bertrand Decocq, Yiping Fang, Zhiguo Zeng, and Anne Barros | 3016 |
| 640 | Interdependency-Aware Resource Allocation for High Availability of 5G-enabled Critical Infrastructures Services Khaled Sayad, Yi-Ping Fang, Anne Barros, Zhiguo Zeng, and Benoît Lemoine | 3024 |
| 660 | A Mathematical Framework for the Evaluation of System Expected Utility Not Satisfied Under Periodic Demand Ali Maatouk, Fadhel Ayed, Wenjie Li, Harvey Bao, Dandan Miao, Ke Lin, Xin Chen, and Enrico Zio | 3032 |
| 168 | Problem, Remedy and Item Identification from Maintenance Long Texts Jordan Makins, Melissa Aspinall, Wei Liu, Michael Stewart, and Melinda Hodkiewicz | 3040 |
| 199 | Identification of Features of Rare Risk Events in Oil Refineries Using Natural Language Processing (NLP) July Bias Macêdoa, Márcio das Chagas Moura, Isis Didier Lins, and Enrico Zio | 3048 |
| 225 | An Ensemble Learning Methodology for Predicting Medical Micro-robot Degradation Classes Paul Cardenas-Lizana, Liseth Pasaguayo, Sergio Lescano, and Zeina Al Masry | 3055 |

| 260 | Computer-Assisted Text Analytics on Resilience by LDA Models Ralf Mock | 3063 |
|-----|---|------|
| 616 | A Taxonomy for Modelling Reports of Process Safety Events in the Oil and Gas Industry Dario Valcamonico, Piero Baraldi, Enrico Zio, Anna Crivellari, Luca Decarli, and Laura La Rosa | 3071 |
| 348 | Condition-Based Opportunistic Maintenance of Cascaded Hydropower Stations Wanwan Zhang, Yiliu Liu, Jiehong Kong, and Hans Ivar Skjelbred | 3079 |
| 352 | PHM Development in Railways: Key Enablers and Challenges Asma Ladj | 3087 |
| 504 | Turbofan Exhaust Gas Temperature Forecasting and Performance Monitoring with a Neural Network Model <i>Langhendries Raphaël and Lacaille Jérôme</i> | 3095 |
| 588 | An Architecture for Predictive Maintenance using 3D Imaging: A Case Study on Railway Overhead Catenary Amit Patwardhan, Adithya Thaduri, Ramin Karim, and Miguel Castano | 3103 |
| 605 | An Assessment of the Application of Real-time YOLOv5 Deep Learning Algorithm in Unmanned Surface Vessels for Environmental Maintenance: Some Preliminary Results Ali Camdal, Biswajit Basu, and Andrea Staino | 3111 |
| 607 | Concrete Applications of Machine Learning in Railways Stéphane Gauthier | 3119 |
| 611 | Hybrid Approach integrated with Gaussian Process Regression for Condition Monitoring Strategies at the Rotor side of a Doubly-fed Induction Generator Shuo Zhang, Emma Robinson, and Malabika Basu | 3127 |
| 233 | How Well Do Human Factors Tools Really Support the Design Process? Diana Paola Moreno Alarcon, Fanni King, Luca Save, and Barry Kirwan | 3135 |
| 307 | A Tale of Two Simulations – the Challenges of Validating a Ground-Air Collaborative Safety Alert Rooseleer, Frederic, Kling, Fanni, Pasztor, Attila, Kirwan, Barry, Humm, Elizabeth, Borghini, Gianluca, Pugh, Jon, and Moreno Alarcon, Diana Paola | 3143 |
| 408 | Using Occurrence Data to Map the Elements of a Risk Model Scott N. MacKinnon, Yaser Farag, Panagiotis Sotiralis, Rithvik Dandu Basappa, Robert Thomson, Barry Kirwin, and Marta Llobet Lopez | 3151 |
| 422 | SHIELD Human Factors Taxonomy and Database for Systematic Analysis of Safety Occurrences in the Aviation and Maritime Domains Sybert Stroeve, Bas van Doorn, Patrick Jonk, Barry Kirwan, and Beatriz Navas De Maya | 3157 |
| 016 | LNG Dispersion Modelling for the Case of Port of Koper, Sloveni Marko Gerbec, Peter Vidmar, Gianmaria Pio, and Ernesto Salzano | 3165 |
| 197 | Organisations: Drifting or Dysfunctional? David H. Slater and Ben J. M. Ale | 3173 |
| 311 | Quantitative Risk Analysis of Alternative Marine Fuels for Bunkering Operations Olga Aneziris and Ioanna A. Koromila | 3181 |

| 335 | Degradation Model Selection Using Depth Functions Arefe Asadi, Mitra Fouladirad, and Diego Rodolpho Tomassi | 3188 |
|-----|--|------|
| 427 | Statistical Characterization of Accidents Occurred in Establishments Pursuant to Seveso Regulation Carla Simeoni, Annalisa Nebbioso, Alessandro Di Francesco, Piero Iacono, Maria Rosaria Vallerotonda, and Annalisa Pirone | 3195 |
| 592 | Increasing the Quality of Road Infrastructure Through Systemic Approach in Safety Management Chatzistelios Georgios, Dermitzakis Emmanoui, Kirytopoulos Konstantinos, and Konstantinidou Myrto | 3202 |
| 310 | Neuro-Symbolic AI for Sensor-based Human Performance Prediction: System Architectures and Applications Inês Filipa Fernandes Ramos, Gabriele Gianini, and Ernesto Damiani | 3210 |
| 322 | Evaluating Safety and Productivity Relationship in Human-Robot Collaboration Aayush Jain, Shakra Mehak, Philip Long, John D. Kelleher, Michael Guilfoyle, and Maria Chiara Leva | 3218 |
| 571 | Safety-Critical Systems in the Automotive Sector: Pros and Cons in the Current State-of-the-Art of Human Performance Assessment Carlos Albarrán Morillo, Devesh Jawla, John D. Kelleher, and Micaela Demichela | 3226 |
| 572 | Human-in-the-Loop Configurations in Process and Energy Industries: A Systematic Review Chidera Winifred Amazu, Micaela Demichela, and Davide Fissore | 3234 |
| 584 | Alarm Management for Human Performance. Are We Getting Better? Houda Briwa, Maria Chiara Leva, and Rob Turner | 3242 |
| 643 | Data Driven Bayesian Network to Predict Critical Alarm Joseph Mietkiewicz and Anders L. Madsen | 3252 |
| 668 | Deep Residual Policy Reinforcement Learning as a Corrective Term in Process Control for Alarm Reduction: A Preliminary Report Ammar N. Abbas, Georgios C. Chasparis, and John D. Kelleher | 3260 |
| 671 | Modifying a Manufacturing Task for Teamwork between Humans and AI: Initial Data Collection to Guide Requirements Specifications Andrés Alonso Pérez, Hector Diego Estrada-Lugo, Enrique Muñoz-de-Escalona Fernéandez, Maria Chiara Leva, Julen Aperribai, and Arkaitz Aranburu | 3267 |
| 069 | Workload Analysis of Health Workers During COVID-19 Vaccination and Organizations of Queues at UBS in City of Franca (SP-BR) Vanessa Bertholdo Vargas, Mario T. Crema, Mayara Gomes Bovo, Moacyr Machado Cardoso Junior, and Jefferson de Oliveira Gomes | 3277 |
| 070 | Assessment of Mental Workload in Aeromedical Transport in Brazil During the COVID-19 Pandemic Virgínia Siva Gomes, Raphael Gomes Cortes, Ruan Carlo Ferreira, Nadyélle Deboleto Oliveira Gomes, Mauro Pascale de Camargo Leite, Emilia Villani, and Moacyr Machado Cardoso, Junior | 3284 |

| 118 | Design of Simulated Takeover Request Task Bilal Alam Khan, Maria Chiara Leva, and Sam Cromie | 3291 |
|-----|---|------|
| 127 | Integrating Transparency Models to Ecological Interface Design Loïck Simon, Clément Guerin, Philippe Rauffet, and Jean-Philippe Diguet | 3301 |
| 149 | Physiological Indicators for Real-Time Detection of Operator's Attention Bojana Bjegojevic, Maria Chiara Leva, Sam Cromie, and Nora Balfe | 3309 |
| 232 | Driver Workload in Truck Platooning: Insights from an On-Road Pilot Study on Rural Roads Maren Helene Rø Eitrheim, Markus Metallinos Log, Trude Tørset, Tomas Levin, and Trond Nordfjærn | 3317 |
| 285 | Framework of Modular Industrial Assembly Workstations in a Collaborative Environment Carlo Caiazzo, Marija Savković, Milan Radenković, Arso Vukićević, Miloš Jovičić, and Marko Djapan | 3325 |
| 507 | Analytical Estimation of Operator Workload in Control Rooms: How Much Time should be Available for Surveillance and Control? Asgeir Drøivoldsmo, Espen Nystad, and Linda Sofie Lunde-Hanssen | 3333 |
| 661 | Exoskeleton-Enhanced Manufacturing: A Study Exploring Psychological and Physical Effects on Assembly Operators' Wellbeing Iveta Eimontaite, Sarah R. Fletcher, Angelo Rizzi, Alfio Minissale, and Fabio F. Abba | 3339 |
| 665 | The Impact of the COVID 19 Pandemic on the Health and Wellbeing of Aviation Workers Employed by Irish Registered Airlines Joan Cahill, Paul Cullen, and Keith Gaynor | 3346 |
| 670 | Video Analysis for Ergonomics Assessment in the Manufacturing Industry: Initial Feedback on a Case Study Hector Diego Estrada-Lugo, Arianna Giuliani, Andres Alonso Perez, Maria Chiara Leva, Gernot Stübl, Thomas Pönitz, Mehmet Tunçel, and Nazim Kemal Ure | 3352 |
| 626 | Do Modern Control Rooms Pertain New Error Mechanisms? Andrew Wright and Andreas Bye | 3360 |
| 011 | Trust and Acceptance of Self-Driving Buses Tor Stålhane and Thor Myklebust | 3367 |
| 024 | Safety Analysis of Evtol Landing in Urban Centers Sarah Francisca de Souza Borges, Moacyr Machado Cardoso Junior, and Diogo Silva Castilho | 3374 |
| 304 | IMU Sensor Faults Detection for UAV using Machine Learning Sheng Ding, Niloy Chakraborty, and Andrey Morozov | 3382 |
| 453 | The Ethics of AI in Autonomous Transport Claire Blackett | 3390 |

| 566 | Modeling Fleet Operations of Autonomous Driving Systems in Mobility as a Service for Safety Risk Analysis Camila Correa-Jullian, John McCullough, Marilia Ramos, Jiaqi Ma, Enrique Lopez Droguett, and Ali Mosleh | 3398 |
|------|---|------|
| 636 | Towards a Harmonized Framework for Vessel Inspection via Remote Techniques Aspasia Pastra and Tafsir Johannson | 3406 |
| Auth | or Index | 3415 |