ESREL 2022

The 32nd European Safety and Reliability Conference (ESREL)

Understanding and Managing Risk and Reliability for a Sustainable Future

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The 32nd European
Safety and Reliability Conference

Understanding and Managing Risk and Reliability for a Sustainable Future

28 August to 1 September 2022
Dublin, Ireland

Edited by

Maria Chiara Leva, Edoardo Patelli, Luca Podofillini
and Simon Wilson

RESEARCH PUBLISHING, SINGAPORE

Published by

Research Publishing (S) Pte Ltd
Blk 11 Upper Boon Keng Road , #12-931, Singapore 380011.
e-mail: editorial@rpsonline.com.sg

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Proceedings of the

Edited by Maria Chiara Leva, Edoardo Patelli, Luca Podofillini, and Simon Wilson

ISBN-13: 978-981-18-5183-4
ISBN-10: 981-18-5183-2

Design, CRC & Printed by C & M Consultants, Singapore. e-mail:enquiries@cmsweb.com.sg
Printed in Singapore.

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Preface

The 32nd edition of the European Safety and Reliability Conference (ESREL) was held in Dublin, Ireland from 28 August 2022 to 1 September 2022. This annual international conference was run under the auspices of the European Safety and Reliability Association (ESRA). ESREL is the key annual event for meetings and knowledge exchange in the area of risk and reliability assessment, risk management and optimization of the performance of socio-technological systems in Europe, and among the most important internationally. It is a place of scientific excellence and an occasion for our community of safety and reliability specialists to meet in a spirit of friendliness in the broadest sense.

This year, the conference focuses on: "Understanding and Managing Risk and Reliability for a Sustainable Future" supporting the 17 Sustainable Development Goals (SDGs) for the 2030 agenda signed by 193 United Nations member countries. Goals such as affordable and clean energy, sustainable cities and communities, industry, innovation and infrastructures and climate action are just a few examples. A sustainable development is crucial for how humanity plans to develop our society in the future and risk assessment and safety management are both a way of looking at the world using the tools and methods developed by safety and reliability engineering to deliver more resilient infrastructures and societies.

In addition, the year 2022 has also seen an unprecedented rising on the living costs, supply shortage, and unstable energy market, due to the invasion of Ukraine and as consequence the changing of the international geopolitical order combined with the lingering effects of the pandemic.

These emergencies and risks are imposing challenges that affect the present and the future of mankind. We would like to mark this edition by proposing to ourselves and our colleagues an opportunity to get involved rather than be removed and disconnected from what is happening around us. Let us apply ourselves to the challenges that touch everyone, and build authentic relationships with anyone who becomes part of our professional and social community. Let us use those relationships to draft some hypotheses for the reconstruction within and beyond the pandemic, for economic sustainability, international cooperation, integral ecology focusing on the care and protection of the weakest in crisis, using scientific research, work, and above all education. These are challenges that put the concepts of risk and sustainability in relation to humanity at the centre of new projects, of new perspectives on which we would like to reflect and discuss.

We are grateful to the ESRA and ESREL community for their contributions to the event through 34 Special Sessions, forming a valuable element of the conference programme. This ESREL conference has also seen the partnership with the Irish Human Factors and Ergonomics Society, the 6th International Symposium on Human Mental Workload. H-Workload, and the International Workshop on Autonomous System Safety: IWASS. exploring a range of topics, including Transdisciplinary Infrastructure Asset Management for Sustainable and Resilient Infrastructure; Safety and Reliability in Road and Rail Transportation; and Risk And Resilience Analysis for Low-Carbon Energy Transition.

Attended by over 600 international experts in safety, reliability and risk management, the rich program of the conference offers 13 sessions with 11 parallel tracks for a total of 570 papers. The contributions cover 19 methodological fields and 23 application areas, including resilience engineering, critical infrastructure, climate change and adaptation, autonomous systems, digital twin, machine learning and artificial intelligence approaches for reliability and safety assessment, mathematical methods in reliability and safety, probabilistic safety assessment, prognostic and maintenance modelling, human factors and interaction of human with intelligent systems. The conference is complemented by 17 keynote speakers of international excellence organised in 8 plenary sessions.

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mbt is an innovative technology company, focused on building mobile, wearable devices that measure EEG. As a group of enthusiasts and world-renown experts, we thrive to transfer great new ideas from labs into the real world and show that the future is already here. Starting from 2012 (and celebrating its X anniversary this year), mbt continuously worked on a mission to develop fully mobile, wearable devices for recording and utilizing brain activity.

Today, our products are present across 50 countries which contributed to much of the novel scientific work, with SMARTING mobile EEG system leading the way and being “the choice of pioneers”

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