Studies in Systems, Decision and Control 449

Pedro M. Arezes · J. Santos Baptista · Rui B. Melo · Jacqueline Castelo Branco · Paula Carneiro · Ana Colim · Nélson Costa · Susana Costa · J. Duarte · J. C. Guedes · Gonçalo Perestrelo *Editors*

Occupational and Environmental Safety and Health IV

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Preface

Occupational and Environmental Safety and Health IV is a compilation of the most recent work of some selected authors from 17 countries (four more than last year) within the occupational safety, health and ergonomics domain.

This book represents the state of the art, and it is mainly based on research carried out at universities and other research institutions, as well as some on-field interventions and case studies. This book also features a section dedicated to reviewing papers for the first time in this series. The chapters that compose it were prepared by recognised experts and allow the reader to quickly have a comprehensive and in-depth view of various subjects.

Due to the broad scope, relevance and originality of the contributions, it is expected that this book contains valuable and up-to-date information, and it presents fundamental scientific research that is being carried out on the subject, as well as contributes to the outreach of practical tools and approaches currently used by OSH practitioners in a global context. All the included contributions were selected based on their potential to show the newest research and approaches, giving visibility to emerging issues and presenting new solutions in occupational safety, health and ergonomics.

This book is based on selected contributions presented at the 18th edition of the International Symposium on Occupational Safety and Hygiene (SHO 2022), held on 8–9 September 2022, in Porto, Portugal.

All the contributions included in this book were previously peer-reviewed by at least two of the 84 members from 12 countries of the International Scientific Committee of the 2021 edition. The event is organised annually by the Portuguese Society of Occupational Safety and Hygiene (SPOSHO).

Editors would like to take this opportunity to thank their academic partners, namely the School of Engineering of the University of Minho, the Faculty of Engineering of the University of Porto, the Faculty of Human Kinetics of the University of Lisbon, the Polytechnic University of Catalonia and the Technical University of Delft. The editors also would like to thank the scientific sponsorship of several academic and professional institutions, the official support of the Portuguese Authority for Working Conditions (ACT), as well as the valuable support of several companies and institutions. Finally, the editors also wish to thank all the reviewers, who gave a

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Occupational and Environmental Safety

Theoretical Analysis of the Worker's Movement Prediction in Construction Sites and Their Stress Level for the Dangerous Situation Prevention

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Abstract The occupational risk assessment methodology called Level of Preventive Action (Lpac) evaluates the amount of preventive action to obtain an optimal prevention level, measuring the degree of danger concerning the building geometry, the worker position concerning the slab edge and the worker's emotional states. The mathematical basis of Lpac can be extended to include the perspective of collective behaviour models, which can describe the predictable human behaviour based on the probability of acts. Research in the mathematical field satisfactorily models the movement that individuals follow or will follow in different scenarios (e.g., street crossing, emergency evacuation), including social parameters such as mood and emotions. This paper presents a theoretical case applied to the predictive analysis of behaviours and interactions between individuals working on constructing a slab. It is essential to include the worker's movement prediction regarding unsafe acts and movements in the risk assessment and add the emotional states. From a case study at the microscopic level, stress can trigger dangerous situations, and its evaluation can prevent them.

Keywords Risk assessment · Workplaces · Risk perception · Heuristic · Stress level

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