Contents

Part I Human Aspects in Composite Manufacturing and Product Evaluation

Study on Light Diffusion of Creped Silk Inserted GFRP ................................. 3
Erika Suzuki, Tetsuo Kikuchi, Kiyoshi Fujiwara, Mamoru Saito,
Yuka Takai and Yuqiu Yang

Research and Development of Robots with Advanced Skills
in Hand Lay-Up ............................................................................................................. 13
Tetsuo Kikuchi and Erika Suzuki

Expert’s Common Factor of Painting Motion in Auto Repair
Painting Process ........................................................................................................ 23
Shigeru Ikemoto, Hiroyuki Hamada and Yuka Takai

Effect of Expert and Non-expert Workers’ Skill Level
on the Quality of Glass Fiber Reinforced Composites
by Hand Lay-Up Method ............................................................................................ 35
Xi Xie, Lili Chen, Yuqiu Yang, Erika Suzuki, Tetsuo Kikuchi
and Hiroyuki Hamada

Analysis of Blowing in Quartz Glass Fire Process .................................................. 47
Masamichi Suda, Toru Takahashi, Akio Hattori, Akihiko Goto
and Hiroyuki Hamada

Process Study of Hand Lay-Up Method to Clarify Implicit
Knowledge of Professionals .................................................................................... 59
Toshihiro Motochika, Masakazu Migaki, Erika Suzuki and Akio Ohtani
Part II  Human Aspects in Textile Manufacturing and Product Evaluation

Interval Timing Analysis of Behavior Patterns on “Kana-Ami” Making Process ....................................................... 71
Zelong Wang, Ken-ichi Tsuji, Toru Tsuji, Yuka Takai, Akihiko Goto and Hiroyuki Hamada

Study on Braiding Skills of Experts with Eye Movement Measurement and Operating Analysis ......................... 79
Kontawat Chottikampon, Shuhei Yasuda, Suchalinee Mathurosemontri, Akihiko Goto and Tadashi Uozumi

Study on the Effect of Arm Movement in Knitting Process on Knitting Quality ....................................... 89
Kontawat Chottikampon, Suchalinee Mathurosemontri, Tadashi Uozumi, Akihiko Goto, Tiemi Funatsuki, Miyako Inoda and Hiroyuki Hamada

Part III  Ergonomic Design of Future Production Systems

Model-Based Evaluation of Cooperative Assembly Processes in Human-Robot Collaboration .......................... 101
Marco Faber, Sinem Kuz, Alexander Mertens and Christopher M. Schlick

Lightweight Robots and Human Interaction in Assembly Systems .................................................. 113
Wilhelm Bauer, Manfred Bender, Peter Rally, Oliver Scholtz and Moritz Hämmerle

Digital Control of Flexible Labor Hours to Support Agile Enterprises and Employees’ Concerns ..................... 123
Wilhelm Bauer, Stefan Gerlach and Moritz Hämmerle

Increasing Safety in Human-Robot Collaboration by Using Anthropomorphic Speed Profiles of Robot Movements ..... 135
Henning Petruck, Sinem Kuz, Alexander Mertens and Christopher Schlick

Thomas Finsterbusch, Andreas Petz, Marco Faber, Jörg Härtel, Peter Kuhlang and Christopher M. Schlick

Interaction Dialog Design for the Use of Mobile Devices While Walking ............................................. 157
Jessica Conradi, Bjoern Nord and Thomas Alexander
A Customizable Digital Human Model for Assembly
System Design ........................................ 167
Jochen Deuse, Alexander Grötsch, Lukas Stankiewicz
and Sascha Wischniewski

Management of Enterprise of the Future in the Ecosystem
of the Internet of Things ............................. 179
Łukasz Sułkowski and Dominika Kaczorowska–Spychalska

Part IV  Industrial Robotics and Intelligent Automation
Development of a Human Factors Roadmap for the Successful
Implementation of Industrial Human-Robot Collaboration .......... 195
George Charalambous, Sarah Fletcher and Philip Webb

Investigating the Effects of Signal Light Position on Human
Workload and Reaction Time in Human-Robot Collaboration
Tasks .................................................. 207
Teegan Johnson, Gilbert Tang, Sarah R. Fletcher and Phil Webb

Gesture Detection Towards Real-Time Ergonomic Analysis
for Intelligent Automation Assistance .......................... 217
Chika Edith Mgbemena, John Oyekan, Ashutosh Tiwari,
Yuchun Xu, Sarah Fletcher, Windo Hutabarat
and Vinayak Prabhu

Assessing Graphical Robot Aids for Interactive Co-working ....... 229
Iveta Eimontaite, Ian Gwilt, David Cameron, Jonathan M. Aitken,
Joe Rolph, Saeid Mokaram and James Law

High Value Intelligent Aerospace Turbofan Jet Engine
Blade Re-manufacturing System ................................ 241
Richard French and Hector Marin-Reyes

Safety System for Industrial Robots to Support Collaboration .... 253
Gunnar Bolmsjö, Mattias Bennulf and Xiaoxiao Zhang

Current Challenges for UX Evaluation of Human-Robot
Interaction ............................................ 267
Jessica Lindblom and Rebecca Andreasson

Assistance Systems in Manufacturing: A Systematic Review .... 279
Xiaozhou Yang and Daniela Alina Plewe
Part V  Ergonomics Design of Manufacturing Processes

Goal-Based Manufacturing Gamification: Bolt Tightening Work
Redesign in the Automotive Assembly Line .......................... 293
Seunghwan Roh, Kyoungwon Seo, Jiyong Lee, Jiho Kim,
Hokyoung Blake Ryu, ChangHo Jung, HyunWoo Lee
and JongHo Shin

A Case Study in an Automotive Assembly Line: Exploring
the Design Framework for Manufacturing Gamification ....... 305
Jiyong Lee, Jiho Kim, Kyoungwon Seo, Seunghwan Roh,
Changho Jung, Hyunwoo Lee, Jongho Shin, Gyunghyun Choi
and Hokyoung Ryu

Prerequisites and Conditions for Socially Sustainable
Manufacturing in Europe’s Future Factories—Results Overview
from the SO SMART Project ........................................... 319
Cecilia Berlin, Ilaria Barletta, Paola Fantini, Konstantinos Georgoulias,
Christoph Hansich, Minna Lanz, Jyrki Latokartano, Marta Pinzone,
Gregor Schönborn, Johan Stahre, Marco Taisch and Reijo Tuokko

Determination of Energy Expenditure of Direct Workers
in Automotive Harnesses Industry ................................. 331
Jorge de la Riva Rodríguez, Esperanza Ibarra Estrada,
Rosa Ma. Reyes Martínez and Arturo Woocay Prieto

Managing OHS in Complex and Unpredictable Manufacturing
Systems: Can FRAM Bring Agility? ............................... 341
Annick Melanson and Sylvie Nadeau

Analysis of Line Balance Sound Board Glue Production
on Assembly Grand Piano Process: Case Study
PT Yamaha Indonesia .................................................. 349
Taufiq Immawan and Riyanto Kurniawan

Part VI  Organization Design and Management

Information and Communication Technologies Supporting
Fuzzy Knowledge Management ................................. 363
Joanna Kałkowska

Agility of Knowledge-Based Organizations ..................... 375
Hanna Wlodarkiewicz-Klimek

Achieving Mass Customization Through Additive Manufacturing . . . . . 385
R.M. Mahamood and E.T. Akinlabi
<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organizational Structure and Agile Enterprise. Anticipated</td>
<td>391</td>
</tr>
<tr>
<td>Effects and Empirical Results from Polish Enterprises</td>
<td></td>
</tr>
<tr>
<td>Edmund Pawlowski and Krystian Pawlowski</td>
<td></td>
</tr>
<tr>
<td>Organizational Learning and Knowledge Management—Insights</td>
<td>403</td>
</tr>
<tr>
<td>from Industrial Managers</td>
<td></td>
</tr>
<tr>
<td>António Amaral, M. Madalena Araújo and Cristina S. Rodrigues</td>
<td></td>
</tr>
<tr>
<td>Flexibility of SMEs</td>
<td>417</td>
</tr>
<tr>
<td>Stefan Trzcieliński</td>
<td></td>
</tr>
<tr>
<td>Part VII Human-Oriented Design of Production Systems</td>
<td></td>
</tr>
<tr>
<td>Effects of Macro-ergonomic Compatibility of Work Demands</td>
<td>431</td>
</tr>
<tr>
<td>on Manufacturing Systems’ Organizational Performance</td>
<td></td>
</tr>
<tr>
<td>Arturo Realyvásquez, Aidé-Aracely Maldonado-Macías,</td>
<td></td>
</tr>
<tr>
<td>Jorge-Luis García-Alcaraz, Karla-Gabriela Gómez-Bull</td>
<td></td>
</tr>
<tr>
<td>and Julio Blanco-Fernández</td>
<td></td>
</tr>
<tr>
<td>Approaches for the Efficient Use of Range Sensors-Based</td>
<td>445</td>
</tr>
<tr>
<td>Ergonomic Assessment Results in the Ergonomic Intervention</td>
<td></td>
</tr>
<tr>
<td>Process of Awkward Working Postures</td>
<td></td>
</tr>
<tr>
<td>Christopher Brandl, Tobias Hellig, Alexander Mertens</td>
<td></td>
</tr>
<tr>
<td>and Christopher M. Schlick</td>
<td></td>
</tr>
<tr>
<td>An Activity Centered Design Framework for Determining Design</td>
<td>455</td>
</tr>
<tr>
<td>Decision Levels in Production Systems</td>
<td></td>
</tr>
<tr>
<td>Cecilia Berlin and Lars-Ola Bligård</td>
<td></td>
</tr>
<tr>
<td>Effects of Human Factors in Planning and Production Control</td>
<td>465</td>
</tr>
<tr>
<td>Activities in Remanufacturing Companies</td>
<td></td>
</tr>
<tr>
<td>Karina Cecilia Arredondo Soto, Humberto Hijar Rivera,</td>
<td></td>
</tr>
<tr>
<td>Jorge de la Riva Rodríguez and Rosa María Reyes Martínez</td>
<td></td>
</tr>
<tr>
<td>Relevant Aspects of Human Error and Its Effect on the Quality</td>
<td>475</td>
</tr>
<tr>
<td>of the Product. Study in the Maquiladora Industry</td>
<td></td>
</tr>
<tr>
<td>Teresa Carrillo-Gutierrez, Rosa María Reyes Martínez,</td>
<td></td>
</tr>
<tr>
<td>Jorge de la Riva Rodríguez and Jaime Sanchez-Leal</td>
<td></td>
</tr>
<tr>
<td>Part VIII Integrated Design of Flexible Production Systems</td>
<td></td>
</tr>
<tr>
<td>Age-Differentiated Modeling and Prediction of the Learning</td>
<td>489</td>
</tr>
<tr>
<td>Time of Sensorimotor Tasks</td>
<td></td>
</tr>
<tr>
<td>Francoise Kuhlenbäumer, Sönke Duckwitz</td>
<td></td>
</tr>
<tr>
<td>and Christopher Marc Schlick</td>
<td></td>
</tr>
<tr>
<td>Employee Data Model for Flexible and Intelligent Assistance</td>
<td>503</td>
</tr>
<tr>
<td>Systems in Smart Factories</td>
<td></td>
</tr>
<tr>
<td>Alexander Arndt and Reiner Anderl</td>
<td></td>
</tr>
</tbody>
</table>
### Dynamic, Adaptive Worker Allocation for the Integration of Human Factors in Cyber-Physical Production Systems
Daniel Strang, Nadia Galaske and Reiner Anderl

517

### Systematic Dimensioning of Personnel Flexibility in Manufacturing
Moritz Hämmerle, Wilhelm Bauer, Dieter Spath and Stefan Gerlach

531

### Approach for the Development of an Adaptive Worker Assistance System Based on an Individualized Profile Data Model
Nadia Galaske and Reiner Anderl

543

### A Competence Based Approach to Support the Working Force Within Assembly Lines
Christiane Dollinger and Gunther Reinhart

557

### The Role of Human Motivation in Quality Inspection of Production Processes
Agnieszka Kujawińska, Katarzyna Vogt and Adam Hamrol

569

### Improving and Embedding Project Management Practices in Organizations—The Human Perspective
Gabriela Fernandes and Madalena Araújo

581

### Group Support Systems Features and Their Contribution to Technology Strategy Decision-Making: A Review and Analysis
Cláudio Santos, Madalena Araújo and Nuno Correia

595

### Projecting Efficacy and Use of Business Simulation Games in the Production Domain Using Technology Acceptance Models
Philipp Brauner, Ralf Philipsen and Martina Ziefle

607

### The Dimensions of Seaports Management in a Static Systemic Approach: A Case Study for Poland
Janusz Rymaniak

621
Advances in Ergonomics of Manufacturing: Managing the Enterprise of the Future
Schlick, C.M.; Trzciiński, S. (Eds.)
2016, XVI, 631 p. 258 illus., 165 illus. in color., Softcover
ISBN: 978-3-319-41696-0