Contents

Part I Section One: Product, Process and Factory Integrated Design

Impacts of Product Lifecycle and Production System Design

on Competitive and Sustainable Production	3
A Framework for Optimizing Product Performance Through Using Field Experience of In-Service Products to Improve the Design and Manufacture Stages of the Product Lifecycle Joel E. Igba, Kazem Alemzadeh, Paul M. Gibbons and John Friis	15
Advanced Product and Process Design Through Methodological Analysis and Forecasting of Energy Consumption in Manufacturing	29
Cost-Based Evaluation for Product Selective Disassemblability	45
Risk Management Methodology Covering the Entire Product Lifecycle	59
An Approach for the Selection of Process Plans Based on Part Family Changes	65
Development of an Open-Architecture Electric Vehicle Using Adaptable Design	79

Ergonomics Issues in Furniture Design: A Case of a Tabloid	
Chair Design	91
M. Iqbal and A. Shamsuzzoha	
Solid Wood Panel Manufacturing Using Low Quality Materials	105
Omar Espinoza, Urs Buehlmann and Maurice Deaver	
Performance-Oriented Manufacturability Analysis	
of a 5 GHz Satellite Oscillator	121
Concept of the System for Optimization of Manufacturing	
Processes	135
Structured Analysis of Reconfigurable	
Manufacturing Systems	147
A Methodology for the Estimation of Build Time	
for Operation Sequencing in Process Planning for a Hybrid Process	159
Zicheng Zhu, Vimal G. Dhokia, Aydin Nassehi and Stephen T. Newman	
Capability-Based Approach for Evaluating the Impact	
of Product Requirement Changes on the Production System Eeva Järvenpää and Seppo Torvinen	173
Manufacturing Processes Design with UML and ERP Standard:	
A Case Study	187
FMEA as Applied to Electronic Manufacturing:	
A Revised Approach to Develop a More Robust and Optimized Solution	197
J. Enright, H. Lewis and A. Ryan	
Simulation of the Pneumatic Behavior in the Virtual	
Commissioning of Automated Assembly Systems	207
A STRUCT OF THE PROPERTY OF THE PARTY OF THE	

Contents

An Innovative Framework for the Simulation of Manufacturing Systems: An Application	
to the Footwear Industry	219
Alexandra F. Marques, Miguel Mujica, Jorge Pinho de Sousa,	
Paulo Sá Marques, Rui Rebelo and António C. Alves	
Multi-Agent Simulation for Concept of Cellular Transport	
System in Intralogistics	233
Mustafa Güller, Yılmaz Uygun and E. Karakaya	
Modeling and Simulation of a Laser Scanner Sensor:	
An Industrial Application Case Study	245
Jose Lima, José Gonçalves, Paulo J. Costa and A. Paulo Moreira	
On the Application of Discrete-Event Simulation	
in Production	259
Farhad Norouzilame and Mats Jackson	
A Simulation Study on Assemble-to-Order Production	
for a Taiwan Machine Tools Manufacturer	273
Yi-Chi Wang, Toly Chen and Fu-Chun Chuang	
The Use of Computer Simulation in Warehouse Automation	285
Joanna Oleśków-Szłapka and Agnieszka Stachowiak	203
Optimal Safety Stock Policy for a Hybrid Manufacturing	
System: A Simulation Study	295
Horng-Chyi Horng	
Modeling and Simulation of the EMG30 Geared Motor	
with Encoder Resorting to SimTwo: The Official	
Robot@Factory Simulator	307
José Gonçalves, José Lima, Paulo J. Costa and A. Paulo Moreira	
New Concepts for a Flexible and Industrialized Production	
Process for FRP-Based Transport Infrastructure	
Components	315
Andreas Kluth and Jens Michael Jäger	
Increasing Flexibility and Productivity in Small	
Assembly Operations: A Case Study	329
P M S Nunes and F I G Silva	

xii Contents

P-SOP Agent Generator for Flexible Manufacturing	341
Flexible Work Organization and Working Time Flexibility as Flexibility Strategies for Small and Medium-Sized Enterprises	355
Agent-Based Service-Oriented Architecture for Heterogeneous Data Sources Management in Ubiquitous Enterprise	367
Implications of Interoperability for Factory Planning	379
Computer Aided Process Planning: A Comprehensive Survey	389
Interoperable Data Provisioning and Discovery for Virtual Factories	401
Designing of Cloud-Based Virtual Factory Information System	415
Enabling Virtual Manufacturing Enterprises with Cloud Computing: An Analysis of Criteria for the Selection of Database as a Service Offers	427
An Infrastructure to Construct an Individualized Manufacturing Information System for Small and Medium Manufacturing Enterprises	439
Business Process Monitoring and Management in Virtual Enterprise Through Interactive User Interface Layer Ahm Shamsuzzoha, Filipe Ferreira, Américo Azevedo, José Faria and Petri Helo	451

Contents xiii

Part II Manufacturing Technologies and Intelligent Systems	
Conceptual Development of Modular Machine Tools for Reconfigurable Manufacturing Systems	467
Global Green Production by Integration of Automated Decision Layers	479
Flexible SOA Based Platform for Research on Start-Up Procedures for Reconfigurable Production Machines	489
Application of Modularity Principles in the Press Tool Enterprise: Reconfigurability	503
Design of a Multifunctional Cell for Aerospace CFRP Production	515
Electrode Wear Estimation and Compensation for EDM Drilling	525
Topography-Selective Removal of Atmospheric Pressure Plasma Polishing	537
A PLCopen-Based Approach for Utilizing Powerful Industrial Robot Functions in PLC-Controlled Applications	547
On Analyzing the Semantics of IEC61131 -3 ST and IL Applications	559
Standard Function Blocks for Product Oriented Programmed Process Data Access	573

xiv Contents

CN2-SD for Subgroup Discovery in a Highly Customized Textile Industry: A Case Study	585
Statistical Process Control Methods as an Essential Tool for Modeling and Improvement of Diagnostic Processes	597
Rough Cut Machining for Impellers with 3-Axis and 5-Axis NC Machines	609
Discharge Parameters for Pass-Through Holes in EDM-Drilling	617
Graph-Based Analysis of Metal Cutting Parameters Sampsa Laakso, Jaakko Peltokorpi, Juho Ratava, Mika Lohtander and Juha Varis	627
A Surface Roughness and Power Consumption Analysis When Slot Milling Austenitic Stainless Steel in a Dry Cutting Environment	637
Development of an Intelligent Bolt Tensioning System and Adaptive Process for the Automated Pitch Bearing Assembly of Wind Turbines	651
Knowledge-Based Operation Planning and Machine Control by Function Blocks in Web-DPP Mohammad Givehchi, Bernard Schmidth and Lihui Wang	665
Self-Learning Production Systems: Adapter Reference Architecture	681

Contents xv

Forecasting Order Quantity for Treadmill Part by Comparison of Time Series Forecast Technologies and Artificial Intelligence Methods	695
Analytical Method for Obtaining Cutter Workpiece Engagement in Five-Axis Milling. Part 3: Flat-End Cutter and Free-Form Workpiece Surface	705
Building a Case Base for the Non-Conformance Problem Solving in the Aluminum Extrusion Process	717
Framework of Optimization of Transport Process with Use of Intelligent Hybrid System Kubiak Natalia and Agnieszka Stachowiak	729
A New Collaborative Filtering-Based Recommender System for Manufacturing AppStore: Which Applications Would be Useful to Your Business?	737
Real-Time Tracking System for a Moored Oil Tanker: A Kalman Filter Approach	749
Managing Automation Development Projects: A Comparison of Industrial Needs and Existing Theoretical Support	761
Issues Affecting Advanced Manufacturing Technology Projects	775
Part III Manufacturing Operations Management and Optimisation	
A Reference Model for a Synchronized and Dynamic Alignment of the Order Fulfillment Process	787
Thomas Wochinger, Frank Zwißler and Engelbert Westkämper	

xvi Contents

Closed-Loop Sustainable Supply Chain Design Under	
UncertaintiesLi-Chih Wang, Tzu-Li Chen, Yin-Yann Chen, Yi-Wen Chen and Allen Wang	799
An Integrated Production and Distribution Scheduling Approach for Exceptions Handling	813
Performance Framework Geared by a Proactive Approach António Almeida and Américo Azevedo	825
Application of Non-conformity Matrix to Predict System Interactions in Complex Quality Problems	839
Nonconformity Root Causes Analysis Through a Pattern Identification Approach	851
Downtime Model Development for Evaluating Operational Performance of Workover Activities in AGOCO	865
Potential Using of OEE in Evaluating the Operational Performance of Workover Activities	877
Operating Curves of Manufacturing Systems: A Theoretical Discourse	887
Elaboration of Reference Models for Improving Enterprise Performance	899
Process Performance Assessment in Collaborative Manufacturing Environments: A Role Oriented Approach António Almeida, Filipe Ferreira, Américo Azevedo and Álvaro Caldas	911

Contents xvii

Measuring Job Satisfaction of Shift Workers Based on Fuzzy Systems Approach	925
Performance Heterogeneity Within a Group: An Empirical Study	935
Gender Equality in Entities Setup in Spanish Science and Technology Parks	947
A Model to Increase Customer Loyalty by Using Bi-directional Semantic Interference: An Application to White Goods Industry	961
A Study into Composite Laminators' Motivation	971
Relationships of Factors in a Manual Assembly Line Environment	985
Clustering for Decision Support in the Fashion Industry: A Case Study	997
Competence-Based Planning of Coupled Process Chains Berend Denkena, Friedrich Charlin and Helge Henning	1009
Social Media in Manufacturing: Just Hype or Concrete Benefits?	1023
RFID Implementation in the Footwear Supply Chain: From Production Line to Retail Store and Back	1035

Costs of Inbound Logistics: Towards a Decision Support Model for Production System Design	1049
PCB Assembly in a Multi-Machine Flowshop with Dynamic Board Release Times	1063
A Multi-Agent Architecture Framework to Improve Wine Supply Chain Coordination	1077
Green Procurement in Trading Sector of Hong Kong Janiz H. Y. Heung, T. N. Wong and L. H. Lee	1089
Resource Allocation in the Paced Assembly of Customer Specific Goods	1103
Injection Mold Maintenance Scheduling with Mold-Lifting Crane Consideration	1117
A Multi-Agent System to Solve a New Formulation of Machine Layout Problem	1129
Organizational Procedures for the Integration of Process Planning and Scheduling in Job-Shop Manufacturing Sascha Häckel, Jan Keidel and Thomas Kehrer	1141
Intelligent Scheduling for Manufacturing Systems: A Case Study	1153
Application of Firefly Metaheuristic Algorithm for the Single Row Facility Layout Problem	1165
Geometrical Optimization of Micro-Mixer with Wavy Structure Design for Chemical Processes Using Taguchi Method	1173

Contents xix

A Multi-Agent Self-Adaptive Architecture for Outsourcing Manufacturing Supply Chain	1185
Inventory Based Multi-Item Lot-Sizing Problem in Uncertain Environment: BRKGA Approach Felix T. S. Chan, R. K. Tibrewal, Anuj Prakash and M. K. Tiwari	1197
Part IV Manufacturing Organization and Strategies	
Challenges for Better Sustainable Manufacturing	1209
The Power of Analytical Approaches Towards the Development of Differentiated Supply Chain Strategies: Case Study	1223
Technology Policy for Promoting Environmental Sustainability in SMEs: Issues and Considerations for Effective Implementation	1237
Proposal of a Deliberate Discovery-Learning Approach to Building Exploration Capabilities in a Manufacturing Organization	1249
Design of Multi-Stage Manufacturing Networks for Personalized Products Using Metaheuristics	1263
New Business Models Elements Oriented to Product-Service Machinery Industry	1277
Reference Model Framework for Production of Small Series of Innovative and Fashionable Goods in Manufacturing Networks	1291

xx Contents

Customer Service in Supply Chain Management: A Case Study	1305
Strategic Fit Assessment for Value-Added Networks of Electric Engine Production	1323
Analysis of the Network of Relations of Organizations Set up at Walqa Technology Park	1335
Distributed Manufacturing System in a Multi-Agent Approach: An Application for Oil Field Management	1347
Part V Lean and Six Sigma Applications	
Exploiting Augmented Reality in Lean Manufacturing: Opportunities and Challenges	1361
Performance Measurement for Efficient Lean Management Jiri Tupa	1375
Lean Management Methods in Product Development: A Case Study	1385
Analysis of the CSFs of Lean Tools and ERP Systems in Improving Manufacturing Performance in SMEs	1401
The Impact of Autonomy on Lean Manufacturing Systems Hanna Theuer, Norbert Gronau and Sander Lass	1413
How to Foresee and Measure the Real Economic Impact of a Lean Manufacturing Implementation	1425

Setup Performance Indicators: A Tool to Systematize and Standardize the Setup Process Diagnosis	1437
J. Morgado, P. Peças, A. Jorge, E. Henriques, R. Cernadas and S. Furtado	1437
Kanban Principle Training Game "Kanban Bar"	1451
Using the Six Sigma DMAIC Methodology to Improve an Internal Logistic Process	1461
Lean Six Sigma Supply Chain Case Study: Aircraft Shipment Improvement in a Pharmaceutical Company	1475
A Comparative Study of the Implementation Status of Lean Six Sigma in South Korea and the UK	1489
The Application of a Lean Philosophy During Manufacture of Advanced Airframe Structures in a New Product Introduction (NPI) Environment	1503
Applying Value Stream Mapping to Identify and Evaluate Waste in a Company of the Ceramic Sector L. B. Luna, P. E. D. Klökner and J. C. E. Ferreira	1515
Specific Strategies for Successful Lean Development Implementation	1527
Adaptation of Lean in the Wood Industry	1539

xxii Contents

Simulation Studies of Hybrid Pull Systems of Kanban and CONWIP in an Assembly Line	1553
Yue Huang, Hung-da Wan, Glenn Kuriger and F. Frank Chen	
Value Stream Mapping Application on Mould Making Industry: Results and Discussion	1565
Implementation of Lean Principles in a Food Manufacturing Company	1579
The Use of Lean Pull Strategy and Simulation in Solving Total Laboratory Automation Problem T. Yang and T. K. Wang	1591
Part VI Energy Efficiency in Factory Life Cycle	
Dual Energy Signatures Enable Energy Value-Stream Mapping	1603
Practical Approach to Analyze and Optimize Energy Efficiency Within a Press Hardening Process	1613
Methodical Approach to Identify Energy Efficiency Measures in Factory Planning Based on Qualitative Analysis	1627
Evaluation of Process Chains for an Overall Optimization of Manufacturing Energy Efficiency	1639
Green Cycle Factory	1653

Contents . xxiii

Visualization of Energy: Energy Cards Create Transparency for Energy-Efficient Factories and Processes	1665
Sustainability Performance Indicators for Supporting the Realization of Sustainable and Energy-Efficient	
Manufacturing	1677
Tapaninaho Mikko, Koho Mikko, Nylund Hasse,	
Heilala Juhani and Torvinen Seppo	
Author Index	1689