

22nd CIRP Conference on Life Cycle Engineering 2015

Procedia CIRP Volume 29

**Sydney, Australia
7-9 April 2015**

Editor:

Sami Kara

ISBN: 978-1-5108-0459-3

Printed from e-media with permission by:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571



Some format issues inherent in the e-media version may also appear in this print version.

Copyright© by Elsevier B.V.
All rights reserved.

Printed by Curran Associates, Inc. (2015)

For permission requests, please contact Elsevier B.V.
at the address below.

Elsevier B.V.
Radarweg 29
Amsterdam 1043 NX
The Netherlands

Phone: +31 20 485 3911
Fax: +31 20 485 2457

<http://www.elsevierpublishingsolutions.com/contact.asp>

Additional copies of this publication are available from:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: 845-758-0400
Fax: 845-758-2634
Email: curran@proceedings.com
Web: www.proceedings.com

TABLE OF CONTENTS

Better – But is it Good Enough? On the Need to Consider Both Eco-efficiency and Eco-effectiveness to Gauge Industrial Sustainability	1
<i>Michael Z. Hauschild</i>	
Industry-university Collaboration in Sustainable Manufacturing	8
<i>Bernard J. Kornfeld, Sami Kara</i>	
Promoting Effectiveness in Sustainable Design	13
<i>Steven J. Skerlos</i>	
The Positive Impact Factory–Transition from Eco-efficiency to Eco-effectiveness Strategies in Manufacturing	19
<i>Christoph Herrmann, Stefan Blume, Denis Kurle, Christopher Schmidt, Sebastian Thiede</i>	
Green Factory Supported by Advanced Carbon-based Manufacturing	28
<i>Domitk Rohrmus, Volkmar Dörich, Nils Weinert</i>	
Analysis of an Energy Oriented Switching Control of Production Lines	34
<i>Nicla Frigerio, Andrea Matta</i>	
Method for Increasing Energy Efficiency in Flexible Manufacturing Systems: A Case Study	40
<i>Hugo M.B. de Carvalho, Jefferson de Oliveira Gomes</i>	
Approach for Implementing a Control and Optimization Loop for an Energy-Efficient Factory	45
<i>Sylvia Wahren, Jörg Siegert, Thomas Bauernhansl</i>	
Assessing Combined Water-Energy-Efficiency Measures in the Automotive Industry	50
<i>Ina Schlei-Peters, Denis Kurle, Matthias Gerhard Wichmann, Sebastian Thiede, Christoph Herrmann, Thomas Stefan Spengler</i>	
E Benchmark - A Pioneering Method for Energy Efficient Process Planning and Assessment Along the Life Cycle Process	56
<i>S. Kreitlein, S. Schwender, T. Rackow, J. Franke</i>	
Automatic Variant Configuration and Generation of Simulation Models for Comparison of Plant and Machinery Variants	62
<i>Adrian Neyrinck, Armin Lechler, Alexander Verl</i>	
KPI-focused Simulation and Management System for Eco-Efficient Design of Energy-Intensive Production Systems	68
<i>Günther Riexinger, Philipp Holtewert, Axel Bruns, Sylvia Wahren, Khoi Tran, Thomas Bauernhansl</i>	
The Need for Better Energy Monitoring within Industry	74
<i>Kristine O’Rielly, Jack Jeswiet</i>	
Assessing the Impact of Embodied Water in Manufacturing Systems	80
<i>Smaeil Mousavi, Sami Kara, Bernard Kornfeld</i>	
Simulation Based Assessment of Lean and Green Strategies in Manufacturing Systems	86
<i>Sebastian Greinacher, Emanuel Moser, Hanjo Hermann, Gisela Lanza</i>	
Hierarchical Modelling of Complex Material and Energy Flow in Manufacturing Systems	92
<i>Samira Alvandi, Georg Bienert, Wen Li, Sami Kara</i>	
3d Thermal Climate Monitoring in Factory Buildings	98
<i>G. Posselt, P. Booi, S. Thiede, J. Fransman, B. Driessen, C. Herrmann</i>	
Energy Efficiency Evaluation for Machining Process in Flexible Manufacturing Systems – A Case Study	104
<i>Hugo M.B. de Carvalho, Jefferson de Oliveira Gomes</i>	
Analysis of Tool Utilization from Material Removal Rate Perspective	109
<i>A.E. Bonilla Hernández, Tomas Beno, Jari Repo, Anders Wretland</i>	
Proposal of a Design Method for Dismantling Products with Split-Lines	114
<i>Yumi Shiraiishi, Naoya Miyaji, Shinichi Fukushge, Yasushi Umeda</i>	
Energy Efficiency Benchmarking Methodology for Mass and High-Mix Low-Volume Productions	120
<i>Yee Shee Tan, Tobias Bestari Tjandra, Bin Song</i>	
Proposal of a Closed Loop Framework for the Improvement of Industrial Systems’ Life Cycle Performances: Experiences from the LinkedDesign Project	126
<i>Daniele Cerri, Marco Taisch, Sergio Terzi, Andrea Buda, Kary Framling, Soumaya El Kaddiri, Ana Milicic, Dimitris Kiritsis, Simone Parrotta, Eric Peukert</i>	
A Sustainability Indicator Framework for Singapore Small and Medium-Sized Manufacturing Enterprises	132
<i>Hui Xian Tan, Zhiquan Yeo, Ruisheng Ng, Tobias Bestari Tjandra, Bin Song</i>	

Decentralised Energy Futures: The Changing Emissions Reduction Landscape	138
<i>Benjamin McLellan, Nick Florin, Damien Giurco, Yusuke Kishita, Kenshi Itaoka, Tetsuo Tezuka</i>	
Sustainability Assessment in Conventional and Industrialized Systems Built in Brazil	144
<i>Durval João De Barba Junior, Jefferson de Oliveira Gomes, Juliana Ferreira Santos Bastos de Lacerda</i>	
Social Life Cycle Assessment of three Companies of the Furniture Sector	150
<i>Carlos Alberto Shuch Bork, Durval João De Barba Junior, Jefferson de Oliveira Gomes</i>	
Energy-orientated Machine Scheduling for Hybrid Flow Shops	156
<i>Fabian Keller, Christina Schönborn, Gunther Reinhart</i>	
Module-based Renewal Planning of Energy Using Products for Reducing Environmental Load and Life Cycle Cost	162
<i>Hiroki Iijima, Saya Yoshida, Shozo Takata</i>	
Remanufacturing of Electronic Control Units: An RFID Based (Service) Interface	168
<i>Joachim Kleyein-Feuerstein, Fabian Joas, Rolf Steinhilper</i>	
Evaluation of Demand Response Actions in Production Logistics	173
<i>Günther Schuh, Ulrich Brandenburg, Yuan Liu</i>	
Method for Designing an Energy-agile Energy System for Industrial Manufacturing	179
<i>Timm Kuhlmann, Thomas Bauernhansl</i>	
An Energy-Cost-Aware Scheduling Methodology for Sustainable Manufacturing	185
<i>Xu Gong, Toon De Pessemier, Wout Joseph, Luc Martens</i>	
Increasing Collaboration Productivity for Sustainable Production Systems	191
<i>Günther Schuh, Christina Reuter, Annika Hauptvogel</i>	
An Approach for Energy-oriented Production Control Using Energy Flexibility	197
<i>Cedric Schultz, Peter Sellmaier, Gunther Reinhart</i>	
Knowledge Based and PLM Facilities for Sustainability Perspective in Manufacturing: A Global Approach	203
<i>Farouk Belkadi, Alain Bernard, Florent Laroche</i>	
Making Sustainability Paradigms a Part of PPC	209
<i>Matthias Putz, Johannes Stoldt, Christin Fanghänel, Annett Bierer, Andreas Schlegel</i>	
Sustainability in the Supply Chain through Synchronization of Demand and Supply in ETO-Companies	215
<i>Patrick Dallasega, Erwin Rauch, Dominik T. Matt</i>	
Coordination of a Manufacturer and Supply Chain Partners for Product Line Design with Consideration of Remanufactured Products	221
<i>R. Aydın, C.K. Kwong, P. Ji</i>	
A System to Increase the Sustainability and Traceability of Supply Chains	227
<i>M. Germani, M. Mandolini, M. Marconi, E. Marilungo, A. Papetti</i>	
Life Cycle Assessment of Electric Vehicles – A Framework to Consider Influencing Factors	233
<i>Patricia Egede, Tina Dettmer, Christoph Herrmann, Sami Kara</i>	
An Energy Analysis of Electric and Pneumatic Ultra-high Speed Machine Tool Spindles	239
<i>Paul Harris, Barbara Linke, Stephen Spence</i>	
Vibration Analysis and Energy Efficiency in Interrupted Face Milling Processes	245
<i>Hugo M.B. de Carvalho, Jefferson de Oliveira Gomes, Marco Antonio Schmidt, Vitor L.C. Brandão</i>	
Holistic Simulation Environment for Energy Consumption Prediction of Machine Tools	251
<i>Eberhard Abele, Steffen Braun, Philipp Schraml</i>	
Quantifying Green Manufacturability of a Unit Production Process Using Simulation	257
<i>Amandeep Singh, Deepu Philip, J. Ramkumar</i>	
Characterising Energy Efficiency of Electrical Discharge Machining (EDM) Processes	263
<i>Wen Li, Sami Kara</i>	
Technical Performance and Energy Intensity of the Electrode-Separator Composite Manufacturing Process	269
<i>J. Schmitt, G. Posselt, F. Dietrich, S. Thiede, A. Raatz, C. Herrmann, K. Dröder</i>	
Customer Integration to Gain Cost Efficiency Alongside Tool's Life Cycle	275
<i>Günther Schuh, Martin Pitsch, Thomas Kühn</i>	
SimGreen: A Serious Game to Learn how to Improve Environmental Integration into Companies	281
<i>Feng Zhang, Peggy Zwolinski</i>	
How Services Influence the Energy Efficiency of Machine Tools: A Case Study of a Machine Tool Manufacturer	287
<i>Gülsüm Mert, Sebastian Waltemode, Jan C. Aurich</i>	
Life Cycle Oriented Milling Tool Management in Small Scale Production	293
<i>Dominik Heeschen, Fritz Klocke, Kristian Arntz</i>	
Data Collection for Energy Monitoring Purposes and Energy Control of Production Machines	299
<i>Eberhard Abele, Niklas Panten, Benjamin Menz</i>	

Optimization of Machining Parameters to Minimize Surface Roughness using Integrated ANN-GA Approach	305
<i>Kuldip Singh Sangwan, Sachin Saxena, Girish Kant</i>	
Reduced Commissioning Time of Components in Machine Tools Through Electronic Data Transmission	311
<i>S. Dosch, A. Spohrer, J. Fleischer</i>	
A Green and Economic Future of Inland Waterway Shipping	317
<i>Wilfried Sihm, Heimo Pascher, Karl Ott, Sandra Stein, Andreas Schumacher, Giuseppe Mascolo</i>	
Innovative High-performance Ceramics – Challenge for the Life Cycle Engineering of Turbomachinery	323
<i>Eckart Uhlmann, Martin Bilz, Jeannette Baumgarten, Tiago Borsoi Klein</i>	
Cutting Fluid Drag-out and Exhaust Air in Grinding Processes: Influence on the Eco-efficiency	329
<i>Nadine Madanchi, Marius Winter, Christoph Herrmann</i>	
Adaptive and Adequate Lubrication for Highest Component-lifetimes in Feed Drive Axes with Ball Screws	335
<i>J. Fleischer, A. Spohrer, U. Leberle, S. Dosch</i>	
Effectiveness of Minimizing Cutting Fluid Use when Turning Difficult-to-cut Alloys	341
<i>Paolo C. Priarone, Matteo Robiglio, Luca Settineri, Vincenzo Tebaldo</i>	
Methodology of Process Oriented Dimensioning of Cooling Lubricant Pressure and Volume Flow for Increasing Energy Efficiency	347
<i>Benjamin Döbbeler, Fritz Klocke, Dieter Lung</i>	
Minimization of the Energy Consumption in Motion Planning for Single-robot Tasks	354
<i>Stefania Pellegri-nelli, Stefano Borgia, Nicola Pedrocchi, Enrico Villagrossi, Giacomo Bianchi, Lorenzo Molinari Tosatti</i>	
Energy Efficient Process Chain: The Impact of Cutting Fluid Strategies	360
<i>Nadine Madanchi, Denis Kurlle, Marius Winter, Sebastian Thiede, Christoph Herrmann</i>	
Expanding the Scope of LCA to Include ‘Societal Value’: A Framework and Methodology for Assessing Positive Product Impacts	366
<i>K.L.F. Shin, J.A. Colwill, R.I.M. Young</i>	
Leveraging Life Cycle Assessment to Evaluate Environmental Impacts of Green Cleaning Products	372
<i>Kathryn G. Van Lieshout, Cindy Bayley, Sarah O. Akinlabi, Lisa von Rabenau, David Dornfeld</i>	
Towards More Holistic Environmental Impact Assessment: Hybridisation of Life Cycle Assessment and Quantitative Risk Assessment	378
<i>Yumi Kobayashi, Greg M. Peters, Stuart J. Khan</i>	
Cradle to Cradle: Effective Vision vs. Efficient Practice?	384
<i>M.E. Toxopeus, B.L.A. de Koeijer, A.G.G.H. Meij</i>	
Analysis of Potential Relationships between Functional Analysis and Life Cycle Assessment	390
<i>Paulina Rodriguez Moreno, Serge Rohmer, Hwong-Wen Ma</i>	
Data-intensive Life Cycle Assessment (DILCA) for Deteriorating Products	396
<i>Raunak Bhinge, Amrita Srinivasan, Stefanie Robinson, David Dornfeld</i>	
Life Cycle Environmental Impact Evaluation of Newly Manufactured Diesel Engine and Remanufactured LNG Engine	402
<i>Junli Shi, Tao Li, Zhichao Liu, Hongchao Zhang, Shitong Peng, Qiuhong Jiang, Jinsong Yin</i>	
Framework to Predict the Environmental Impact of Additive Manufacturing in the Life Cycle of a Commercial Vehicle	408
<i>Mathias Burkhart, Jan C. Aurich</i>	
Life Cycle Assessment of One-way and Pooled Pallet Alternatives	414
<i>Jonas Bengtsson, James Logie</i>	
Environmental Comparison of Metal Coating Processes	420
<i>Karel Kellens, Dimos Paraskevas, Wim Dewulf, Joost R. Duflou</i>	
Interaction between New Car Design and Recycling Impact on Life Cycle Assessment	426
<i>Vi Kie Soo, Paul Compston, Matthew Doolan</i>	
Life Cycle Assessment of CRT, LCD and LED Monitors	432
<i>Vikrant Bhakar, Aashray Agur, A.K. Digalwar, Kuldip Singh Sangwan</i>	
Goal-oriented Life Cycle Investigations for Composite Manufacturing Chains	438
<i>F. Lindner, R. Schmitt</i>	
Life Cycle Assessment of a Mini Hydro Power Plant in Indonesia: A Case Study in Karai River	444
<i>Jessica Hanafi, Anthony Riman</i>	
A Big Data Analytics Approach to Develop Industrial Symbioses in Large Cities	450
<i>Song Bin, Yeo Zhiquan, Low Sze Choong Jonathan, Derek Koh Jiewei, Denis Kurlle, Felipe Cerdas, Christoph Herrmann</i>	

Development of the Methodology for Environmental Impact of Composite Boats Manufacturing Process	456
<i>Yong-Kuk Jeong, Philippe Lee, SeungHoon Nam, Dong Kun Lee, Jong-Gye Shin</i>	
Carbon Footprint of Cassava Starch Production in North-Eastern Thailand	462
<i>Phairat Usubharatana, Harnpon Phungrassami</i>	
Environmental Impact Analysis of a Water Supply System: Study of an Indian University Campus	468
<i>Vikrant Bhakar, Nitesh Sihag, Rebekka Gieschen, Stefan Andrew, Christoph Herrmann, K.S. Sangwan</i>	
From LCC to LCA Using a Hybrid Input Output Model – A Maritime Case Study	474
<i>Louise Laumann Kjær, Aris Pagoropoulos, Michael Hauschild, Morten Birkved, Jannick H. Schmidt, Tim C. McAloone</i>	
Integrated Carbon Metrics and Assessment for the Built Environment	480
<i>Soo Huey Teh, Thomas Wiedmann, Judith Schinabeck, Hazel Rowley, Stephen Moore</i>	
Material Flow Cost Accounting Extended to the Supply Chain – Challenges, Benefits and Links to Life Cycle Engineering	486
<i>Martina Prox</i>	
KPI and LCA Evaluation of Integrated Microwave Technology for High Temperature Processes	492
<i>C. Dorn, R. Behrend, D. Giannopoulos, L. Napolano, B. García Baños, V. James, V. Uhlig, J.M. Catalá, M. Founti, D. Trimis</i>	
Quantifying the Life Cycle Water Consumption of a Machine Tool	498
<i>Jahau Lewis Chen, Yen-Bou Chen, Hua-Chih Huang</i>	
Assessing the Environmental Performance of Machine Tools – Case Studies Applying the ‘LCA to go’ Webtool	502
<i>Florian Krautzer, Rainer Pamminer, Carl Diver, Wolfgang Wimmer</i>	
Application of Life Cycle Assessment (LCA) and Design of Experiments (DOE) to the Monitoring and Control of a Grinding Process	508
<i>Diogo A.L. Silva, Remo A.P. Filleti, André L. Christoforo, Eraldo J. Silva, Aldo R. Ometto</i>	
Addressing Sustainability and Flexibility in Manufacturing Via Smart Modular Machine Tool Frames to Support Sustainable Value Creation	514
<i>Bernd Peukert, Stephan Benecke, Janire Clavell, Sabrina Neugebauer, Nils F. Nissen, Eckart Uhlmann, Klaus-Dieter Lang, Matthias Finkbeiner</i>	
Metrics-based Sustainability Evaluation of Cryogenic Machining	520
<i>Tao Lu, I.S. Jawahir</i>	
Tool State Assessment for Reduction of Life Cycle Environmental Impacts of Aluminium Machining Processes via Infrared Temperature Monitoring	526
<i>A. Simeone, E.B. Woolley, S. Rahimifard</i>	
The Conceptualization of Sustainability in Operations Management	532
<i>David Opresnik, Marco Taisch</i>	
Simulation-based Approach for Eco-optimized Production Control Systems	538
<i>Christian Brecher, Simon Müller, Marc Kujas, Wolfram Lohse</i>	
Sustainability in Manufacturing through Distributed Manufacturing Systems (DMS)	544
<i>Erwin Rauch, Matthias Dallinger, Patrick Dallasega, Dominik T. Matt</i>	
Effective Integration of Life Cycle Engineering in Education	550
<i>E.J. Oude Luttikhuis, M.E. Toxopeus, E. Lutters</i>	
Assessment Framework and Material Flow Analysis of Material Recovery Facilities Within the U.S. to Track Consumer Electronics by Product Category	556
<i>Jennifer Mangold, Kathy Cristobal, Carole Mars, David Dornfeld</i>	
Enablers and Barriers of Sustainable Manufacturing: Results from a Survey of Researchers and Industry Professionals	562
<i>Neeraj Bhanot, P. Venkateswara Rao, S.G. Deshmukh</i>	
Accounting the Impacts of Waste Product in Package Design	568
<i>Tim Grant, Victor Barichello, Leanne Fitzpatrick</i>	
Evolving Product Information in Aligning Product Development Decisions across Disciplines	573
<i>E.J. Oude Luttikhuis, J. de Lange, E. Lutters, R. ten Klooster</i>	
Design and Manufacturing of a Sustainable Pedelec	579
<i>Tom Buchert, Jón Garðar Steingrímsson, Sabrina Neugebauer, The Duy Nguyen, Mila Galeitzke, Nicole Oertwig, Johannes Seidel, Randy McFarland, Kai Lindow, Haygazun Hayka, Rainer Stark</i>	
Investigating the Energy Consumption of the PECM Process for Consideration in the Selection of Manufacturing Process Chains	585
<i>Martin Swat, Andreas Rebschläger, Kirsten Trapp, Tim Stock, Günther Seliger, Dirk Bähre</i>	
Data-oriented Technical Complaint Management for Sustainable Problem Solution	591
<i>Alexander Linder, Robert Schmitt</i>	
A Study on Optimum Circulation Period of Products for Minimizing Lifecycle Energy Consumption	597
<i>Yuji Mizuno, Naoya Kintoki, Yusuke Kishita, Shinichi Fukushige, Yasushi Umeda</i>	

Target-oriented Modularization – Addressing Sustainability Design Goals in Product Modularization	603
<i>Friedrich A. Halstenberg, Tom Buchert, Jérémy Bonvoisin, Kai Lindow, Rainer Stark</i>	
Growing Near Net Shape Components from Renewable Materials	609
<i>Manuel Löwer, Anna-Lena Beger, Iliyas Raza, Jörg Feldhusen, Alexandra Wormit, Jürgen Prell, Björn Usadel, Thomas-Benjamin Seiler, Christoph Kämpfer, Henner Hollert, Martin Trautz</i>	
Immaterial Elements as Drivers of Sustainability in Products and Services	615
<i>P. Julio Cesar Rivera, O. Bernabé Hernandis, M. Sheila Cordeiro, O. Omar Miranda</i>	
On the Applicability of Sustainability Assessment Tools in Manufacturing	621
<i>Anastasiia Moldavska, Torgeir Welo</i>	
Defining Circulation Factories – A Pathway towards Factories of the Future	627
<i>Felipe Cerdas, Denis Kurlé, Stefan Andrew, Sebastian Thiede, Christoph Herrmann, Yeo Zhiquan, Low Sze Choong Jonathan, Song Bin, Sami Kara</i>	
Prerequisites for a High-level Framework to Design Sustainable Plants in the E-waste Supply Chain	633
<i>Ilaria Barletta, Björn Johansson, Johanna Reimers, Johan Stahre, Cecilia Berlin</i>	
Conceptualizing ReX for Aggregating End-of-life Strategies in Product Development	639
<i>Siru Sihvonen, Tuomas Ritola</i>	
Investigation into Alternative Cooling Methods for Achieving Environmentally Friendly Machining Process	645
<i>Y.R. Ginting, B. Boswell, W. Biswas, M.N. Islam</i>	
Machine-based Dismantling of End of Life Vehicles: A Life Cycle Perspective	651
<i>Ezzat El Halabi, Mike Third, Matthew Doolan</i>	
Network Design and Optimization for Multi-product, Multi-time, Multi-echelon Closed-loop Supply Chain under Uncertainty	656
<i>Anil Jindal, Kuldip Singh Sangwan, Sachin Saxena</i>	
Resource Efficiency and Composite Waste in UK Supply Chain	662
<i>Norshah Aizat Shuaib, Paul Tarisai Mativenga, James Kazie, Stella Job</i>	
Towards a Circular Economy for End-of-Life Vehicles: A Comparative Study UK – Japan	668
<i>Mélanie Despeisse, Yusuke Kishita, Masaru Nakano, Michael Barwood</i>	
Optimization of a Non-Hazardous Integrated Solid Waste Processing Line	674
<i>Camille Jourdain, Peggy Zwolinski</i>	
Modeling the Value Recovery of Rare Earth Permanent Magnets at End-of-Life	680
<i>Liang Cong, Hongyue Jin, Pete Fitsos, Timothy McIntyre, Yuehwern Yih, Fu Zhao, John W. Sutherland</i>	
Use of Post-consumer Scrap in Aluminium Wrought Alloy Structural Components for the Transportation Sector	686
<i>Kristian Martinsen, Sverre Gulbrandsen-Dahl</i>	
Maintenance Decisions of Part Agent Based on Failure Probability of a Part Using Bayesian Estimation	692
<i>Keisuke Nanjo, Yuki Yamamori, Yumihito Yokoki, Yuta Sakamoto, Hiroyuki Hiraoka</i>	
Two-stage Sequence Generation for Partial Disassembly of Products with Sequence Dependent Task Times	698
<i>Robert J. Riggs, Xiaoning Jin, S. Jack Hu</i>	
Economic and Environmental Evaluation of Fasteners for Active Disassembly: A Case Study for Payment Terminals	704
<i>Jef R. Peeters, Paul Vanegas, Wim Dewulf, Joost R. Duflou</i>	
Availability-based Payback Method for Energy Efficiency Measures	710
<i>Robert Kasprowicz, Carolin Schulz</i>	
Robot Assisted Disassembly for the Recycling of Electric Vehicle Batteries	716
<i>Kathrin Wegener, Wei Hua Chen, Franz Dietrich, Klaus Dröder, Sami Kara</i>	
An Investigation into Minimising Total Energy Consumption and Total Completion Time in a Flexible Job Shop for Recycling Carbon Fiber Reinforced Polymer	722
<i>Ying Liu, Ashutosh Tiwari</i>	
Design and Implementation of an End-of-Life Vehicle Recycling Center Based on IoT (Internet of Things) in Korea	728
<i>Hwa-Cho Yi, Jung Whan Park</i>	
Recycling of CFRP for High Value Applications: Effect of Sizing Removal and Environmental Analysis of the SuperCritical Fluid Solvolysis	734
<i>Michel Dauguet, Olivier Mantaux, Nicolas Perry, Yaoyao Fiona Zhao</i>	
Scenarios for the Return of Lithium-ion Batteries out of Electric Cars for Recycling	740
<i>Nirugaa Natkumarajah, Matthias Scharf, Peter Scharf</i>	
Utilisation of Reconfigurable Recycling Systems for Improved Material Recovery from E-Waste	746
<i>M. Barwood, J. Li, T. Pringle, S. Rahimifard</i>	

Opportunities to Improve Recycling of Automotive Lithium Ion Batteries	752
<i>Alexandru Sonoc, Jack Jeswiet, Vi Kie Soo</i>	
A Study of Fatigue Remaining Useful Life Assessment for Construction Machinery Part in Remanufacturing	758
<i>Yaozhong Wu, Weijia Li, Ping Yang</i>	
Remanufacturing Decision Based on RUL Assessment	764
<i>Yawei Hu, Shujie Liu, Hongchao Zhang</i>	
Exploring New Horizons for Remanufacturing an Up-to-date Overview of Industries, Products and Technologies	769
<i>Rolf Steinhilper, Fernand Weiland</i>	
The Impact of Automotive Product Remanufacturing on Environmental Performance	774
<i>S.S. Yang, H.Y. Ngiam, S.K. Ong, A.Y.C. Nee</i>	
Towards Facilitating Circular Product Life-Cycle Information Flow via Remanufacturing	780
<i>Jelena Kurilova-Palisaitiene, Louise Lindkvist, Erik Sundin</i>	
WRCloud: A Novel WEEE Remanufacturing Cloud System	786
<i>Xi Vincent Wang, Lihui Wang</i>	
Impact of Multi-material Components on the Assembly and Disassembly of Traction Batteries	792
<i>Alexander Tornow, Stefan Andrew, Franz Dietrich, Klaus Dröder</i>	
Remanufacturing-Oriented Geometric Modelling for the Damaged Region of Components	798
<i>Yingzhong Zhang, Zhenyan Yang, Guangzhi He, Yun Qin, Hong-chao Zhang</i>	
Influence of Powders and Process Parameters on Bonding Shear Strength and Micro Hardness in Laser Cladding Remanufacturing	804
<i>Mingsan Xu, Jianfeng Li, Jibin Jiang, Bingbing Li</i>	
Simplified Life Cycle Assessment and Analysis of Remanufacturing Cleaning Technologies	810
<i>Shitong Peng, Tao Li, Junli Shi, Hongchao Zhang</i>	
Energy Use in Premanufacture (Mining)	816
<i>J. Jeswiet, J. Archibald, U. Thorley, E. De Souza</i>	
Resource Efficiency Optimization of Manufacturing Processes Using Evolutionary Computation: A Turning Case	822
<i>Frank Kübler, Johannes Böhner, Rolf Steinhilper</i>	
Supercritical CO₂ Cleaning of Carbonaceous Deposits on Diesel Engine Valve	828
<i>Weiwei Liu, Xiaochuan Qing, Mingzheng Li, Lihong Liu, Hongchao Zhang</i>	
Reducing the Development Life Cycle of Automotive Valves and Seat Valves Using a New Workbench for High Temperature Wear Testing	833
<i>Luis Alberto Breda Mascarenhas, Jefferson de Oliveira Gomes, Andrey Teixeira Portela, Cristiano Vasconcellos Ferreira</i>	
Efficiency and Environmental Analysis of a System for Renewable Electricity Generation and Electrochemical Storage of Residential Buildings	839
<i>Michele Germani, Daniele Landi, Marta Rossi</i>	
A Cost and Resource Consumption Model for Improving Resource Efficiency of Configurable Roll-to-roll Processing	845
<i>Yeo Zhiquan, Ng Ruisheng, Song Bin</i>	
Author Index	