Table of contents

Volume 1

Foreword Members of the International Program Committee Members of the International Paper Review Panel

1 INVITED PAPERS

Challenges and answers for competitive engineering *Jacob T. Fokkema, Imre Horváth (NL)*

Digital simulation and computational technologies in the aerospace industry *Rodney Dreisbach (USA)*

Cognitive product development: A method for continuous improvement of products and processes *Wim Gielingh (NL)*

Frontloading design engineering through virtual prototyping and virtual reality: Industrial applications

Herman van der Auweraer (B)

Cultural diversity and design

Daan van Eijk, Henri Christiaans, Kamiel de Leur (NL)

IT innovations and their impact on industrial design and manufacturing *Bart H. M. Gerritsen (NL)*

The Holovizio 3D display system

Tibor Balogh, Péter Tamás Kovács, Zsuzsa Dobrányi, Attila Barsi, Zoltán Megyesi, Zoltán Gaál, Gáspár Balogh (H)

Shape re-engineering by photogrammetry: From applied research to industrial practice

Herbert J. Koelman (NL)

Failure analysis, forensic engineering and court cases *Jan Spoormaker (NL), Jesper Bogelund (DK)*

2 INDUSTRIAL DESIGN ENGINEERING

Advanced shape design

Direct merging of triangle meshes preserving simulation semantics for fast modification of numerical models

Ruding Lou, Alexei Mikchevitch, Jean-Philippe Pernot, Philippe Véron (F)

Solid deflation approach to transform solid into mid-surface Dong-Pyoung Sheen, Tae-geun Son, Dae-Kwang Myung, Cheolho Ryu, Sang Hun Lee, Kunwoo Lee, Tae Jung Yeo (KO)

Octree-based boundary evaluation for general sweeps Hüseyin Erdim, Horea T. Ilies (USA)

Parameter reconstruction of freeform shapes for improved product modeling *Thomas R. Langerak (NL)*

Computational shape manipulation

A software tool for testing algorithms for point cloud manipulation David Eržen, Nikola Vukašinović, Jože Duhovnik (SLO)

Towards recovery of complex shapes in meshes using shaded images *Minica Panchetti, Jean-Philippe Pernot, Philippe Véron (F)*

CADFORSIM: Rules to improve the mesh quality

Michael Reimeringer, Nicolas Gardan, Yvon Gardan (F), Hasan Ugur (TR)

Accuracy prediction and optimization model in non-contact laser reverse engineering process

Marjan Korošec, Jože Duhovnik, Nikola Vukašinović (SLO)

Virtual and augmented reality

Evaluation of holographic displays - Are they 3D visualization solution for conceptual design? Eliab Z. Opivo, Imre Horváth (NL)

Design of a visualization system integrated with haptic interfaces *Monica Bordegoni, Umberto Cugini, Mario Covarrubias (I)*

Enabling interactive augmented prototyping by a plug-in-based software architecture *Jouke Verlinden, Imre Horváth (NL)*

Augmented reality in mobile machinery assembly *Juha Sääski, Tapio Salonen, Asko Riitahuhta (FI)*

Product concept development

Patent driven design: Exploring possibility of using patents to drive new design *Ajit Singh Kanda, Sudhakar Teegavarapu, Joshua D. Summers, Gregory Mocko (USA)*

Integrating TRIZ and QFD effectively in product development: A case study *Edoardo Rovida, Marco Bertoni, Marina Carulli, Umberto Giraudo (I)*

Support of design engineering activity through C&CM- Temporal decomposition of design problems

Albert Albers, Sven Matthiesen, Sebastian Thau, Thomas Alink (D)

Tools and methods for shape ideation - Which ones do designers use, like, desire or need?

Tjamme Wiegers, Joris S. M. Vergeest (NL)

Culturally sensitive design

Lighting for rural Cambodia: An example of social responsible design *Johan Carel Diehl, Sacha Silvester, Stephen Boom (NL)*

Meaning structure modeling on the design conceptual level Georgi V. Georgiev, Yukari Nagai, Toshiharu Taura, Junya Morita (J)

The culture difference in embodiment design education *Lau Langeveld (NL)*

Functional flexibility: Does it enhance or hinder effective teamwork within a manufacturing environment? Kym Fraser, Howard Harris (AU)

Designing for product experience

Sketches analysis to support 3D CAD modelling in aesthetic product design *Maura Mengoni, Michele Germani (I)*

Aesthetic consequences of making car exteriors visually robust to geometric variation

Karin Forslund, Rikard Söderberg (S)

Materials experience: Descriptive categories in material appraisals *Elvin Karana, Paul Hekkert, Prabhu Kandachar (NL)*

3 COMPETITIVE PRODUCT DEVELOPMENT

Human aspects in design

Integrating an expert user in design process: How to make out surgeon needs during a new surgical instrument design – A case study *Rahi Rasoulifar, Guillaume Thomann, François Villeneuve (F)*

Knowledge processing for advanced digital human modelling *Niels C. C. M. Moes (NL)*

The function and consequences of pressure in product development processes *Udo Pulm, Ralf Stetter (D)*

Product data management for co-engineering Henk Jan Pels (NL), Chun Gu (CN), Piet van Dongen (NL)

Principles and guidelines for design

Modelling functions as operations on material, energy and signal flows: Conceptual problems and possible solutions

Pieter E. Vermaas (NL)

Systematic design tools: A South Pacific approach to investigate the use of new design guidelines

Mark Goellner, Sarah Wakes, Christopher T. Shaw (NZ)

On the concept of "integration"

Caroline Bramklev (S)

Product function analysis for the design of goals *Wim Poelman (NL)*

Product structure development

A structural optimization method with XFEM and level set models Peng Wei, Michael Yu Wang (HK)

Design rationale for efficient product platform development - A systematic configurable component approach

Stellan Gedell, Hans Johannesson, Lennart Holmberg (S)

A configuration grammar design approach for product family modelling in conceptual design

Eugeniu-Radu Deciu, Egon Ostrosi, Michel Ferney (F), Marian Gheorghe (RO)

Methodical development of innovative robot drives

Ralf Stetter, Andreas Paczynski, Michal Zając (D)

Computational design simulation

Design and simulation of distributed assemblies – The hybrid vehicle example *Mustafa Taner Eskil (TR), Jon Sticklen (USA)*

Simulating the use of products: Applying the nucleus paradigm to resource-integrated virtual interaction models

Wilfred van der Vegte, Imre Horváth, Zoltán Rusák (NL)

Integration of a flexible pipes simulation tool in a CAD system *Roberto Raffaeli, Marco Mandolini, Michele Germani (I)*

Interactive force control in real time simulation of grasping virtual objects *Zoltán Rusák, Imre Horváth, Wilfred van der Vegte (NL), Csaba Antonya (RO)*

Computational optimization of products

Coupling functions treatment in a bi-level optimization process *Benoît Guédas, Philippe Dépincé (F)*

Use of numerical methods for constraint-based design and optimization Jonathan Feldman, Rorie Edmunds, Ben Hicks, Glen Mullineux (UK)

Mechanical properties of self-expandable stents: A key to product design of suitable stents

Daisuke Yoshino, Katsumi Inoue, Yukihito Narita (J)

Design configurations and coupling high temperature gas-cooled reactor and hydrogen plant

Chang H. Oh, Eung Soo Kim, Steven Sherman (USA)

Specific problems of design

Computer-based design of forming shoulders Ben Hicks, Glen Mullineux, Jason Matthews, Tony Medland (UK)

Quick estimation of temperature in electronic products Ruben Strijk, Joris S. M. Vergeest, Han C. Brezet (NL)

Investigating the effects of machine parameters on the carton erection process of a high speed packaging machine

Baljinder Singh, Jason Matthews, Glen Mullineux, Tony Medland (UK)

Optimizing the high frequency (HF) tube welding process: A systems approach $Karel\ Swanepoel\ (ZA)$

Volume 2

4 ENHANCEMENT OF ENGINEERING PROCESSES

Education for competitive engineering

Enhancing engineering students' creativity

Gaetano Cascini, Davide Russo, Daniele Regazzoni, Caterina Rizzi (I)

A rubrics-based methodological approach for evaluating the design competency of engineering students

Remon Pop-Iliev, George Platanitis (CA)

Attitude development in designers' education

Ellemieke van Doorn, Niels Moes (NL), Nuša Fain (SLO)

Educational "ecosystem" for information systems engineering *Marite Kirikova, Janis Grundspenkis, Uldis Sukovskis (LV)*

Improving engineering processes

Process modeling for considerate design: Make personalization economically viable Claudia M. Eckert, David C. Wynn, P. John Clarkson, Sandy Black (UK)

Infrastructures, methods and techniques for global collaborative engineering Courtney Berglund, C. Greg Jensen (USA)

Collaborative engineering in customising and product development *Edward Chlebus (PL)*

NC programming for high precision CNC turning with effective cutting edge representation

Zezhong C. Chen, Saeed R. Al-Taher (CA)

Competitiveness of small enterprises

Community based design support

Jaap Daalhuizen, Petra Badke-Schaub, Jenneke Fokker (NL)

Assessed, interactive and automated reification in a virtual community of practice *Philippe Rauffet, Alain Bernard, Catherine Da Cunha (F), Niek Du Preez, Louis Louw, Wilhelm Uys (ZA)*

Improving product design in SME by using design automation *Giorgio Colombo, Dante Pugliese (I)*

Advances in mass customization and adaptive manufacturing *Bart H. M. Gerritsen (NL)*

Prediction in lifecycle engineering

Prediction limits for order statistics in future samples with some applications to product lifecycle

Nicholas A. Nechval, Konstantin N. Nechval, Gundars Berzins, Vadim Danovich, Maris Purgailis (LV)

Addressing the problems of linking present and future and measuring sustainability in developing sustainable technologies: A proposal for a risk-based double-flow scenario methodology

A. Idil Gaziulusoy, Carol Boyle (NZ)

'Causality' in in-service information and design actions Santosh Jagtap, Aylmer Johnson, Marco Aurisicchio, Ken Wallace (UK)

Strategies towards maturity of product information objects to manage concurrent engineering processes

Matthias Kreimeyer, Frank Deubzer, Ulrich Herfeld, Udo Lindemann (D)

Product data technologies

Service oriented architecture for the integration of domain specific PLM systems within the mechatronic product development *Michael Abramovici, Fahmi Bellalouna (D)*

A contribution to engineering data sharing in discipline-spanning global environments *Reiner Anderl, Diana Völz, Thomas Rollmann, Koy Lee (D)*

A framework for data exchange in layered manufacturing Guillaume J. van Niekerk, Elizabeth M. Ehlers (ZA)

A feature based framework for semantic interoperability of product models Ravi Kumar Gupta, Balan Gurumoorthy (IN)

Methods for architectural design

Morphological prescriptive reflection overview in building design *Wim Zeiler, Perica Savanovic, Emile Quanjel (NL)*

Performance-based Pareto optimal design

I. Sevil Sariyildiz, Michael S. Bittermann, Ozer Ciftcioglu (NL)

Reverse engineering for industrial-environment CAD models Rodrigo de Toledo (BR), Bruno Lévy (F), Jean-Claude Paul (CN)

5 OPERATION IN VIRTUAL ENTERPRISES

Process improvement methodologies

Linkage meta-modelling to support the development of design process improvement tools

David C. Wynn, P. John Clarkson (UK)

Examinations of environment-based design through cognitive experiment Shengji Yao, Yong Zeng (CA)

Investigating design process performance under uncertainty

Marek J. Chalupnik, David C. Wynn, Claudia M. Eckert, P. John Clarkson (UK)

Unconventional technologies and competitive engineering in the 21st century *Marcel Popa, Glad Contiu, Mircea Precup, Dan Preja, Ovidiu Gaina, Cristian Fagarasan (RO)*

Product service systems

Design for service: The new challenge for long-life products Claudia Eckert, Warren Kerley, P. John Clarkson, Michael Moss (UK)

Economic mobile computing utilizing mobile devices forming virtual organizations *Gerard Gouws, Elizabeth M. Ehlers, Ockmer L. Oosthuizen (ZA)*

An analysis of public use bicycle systems from a product-service system perspective *Duygu Keskin, Han Brezet, Naz Börekçi, Johan Carel Diehl (NL)*

Benefits of agent-based support for operations and servicing in virtual enterprises *Ockmer L. Oosthuizen, Elizabeth M. Ehlers (ZA)*

Competitive virtual enterprises

A model for management of critical situations caused by flooding *Viveca Asproth, Anita Håkansson, Péter Révay (S)*

Supporting system for virtual enterprises' configuration – Requirements gathering Branislav Fidler, Štefan Valčuha, Adrián Guniš (SK)

Integration mechanisms affecting the R&D-marketing interface in SMEs of growing economies: The case of Slovenia

Nuša Fain, Tanja Mavrič, Jože Duhovnik (SLO), Jan P. L. Schoormans (NL)

Contextual approach of extended enterprise processes – Application to VIVACE European project

Pierre-Laurent Frossard, Thomas Nguyen Van, Benoit Eynard, Dominique Deneux (F)

Advanced manufacturing processes

A framework for a cognitive design-to-fabrication system Kristina Shea, Marco Engelhard, Christoph Ertelt, Frank Hoisl (D)

Decision supporting of production planning and control by means of key production performance measuring indicators

Tibor Tóth, Ferenc Erdélyi, Gyula Kulcsár (H)

Cutting process optimization on the basis of CNC adaptive programming *Alexander Sharmazanashvili (GE)*

Developing a universal gearing design and gear manufacturing investigation tool László Dudás (H)

Handling complexities in engineering

Handling complexity - A methodological approach comprising process and knowledge management

Albert Albers, Tobias Deigendesch, Mirko Meboldt (D)

An algorithm for assessing design complexity through a connectivity view *Joshua D. Summers, Farhad Ameri (USA)*

Some reflections on ontologies in engineering domain Sanghee Kim, Rob Bracewell, Ken Wallace (UK)

Localisation in manufacturing using customisable translator agents Wai Sze Leung, Elizabeth M. Ehlers (ZA)

Application of knowledge technologies

An agent-based tool for China's express delivery SME-s *Duo Xu, T. N. Wong (HK)*

A methodology for KEE systems target cascading Marco Bertoni (I), Christian Johansson, Tobias Larsson, Ola Isaksson (S)

Agile PDM-implementation *Jörg Feldhusen, Frederik Bungert, Manuel Löwer (D)*

6. POSTER AND FORUM PRESENTATIONS

Poster cluster: Industrial design engineering

Observation of natural phenomena as source of innovative solutions in engineering design

Francesco Rosa, Edoardo Rovida, Roberto Viganò, Luigi Nava, Pietro Ponti (I)

Redesigning objects with free form surfaces Gábor Renner, Evgeny Lomonosov (H)

An engine of creativity in product development *Elsa Henriques, Arlindo Silva, José Gaspar (PT)*

Design method development: A case study and survey Sudhakar Teegavarapu, Joshua D. Summers, Gregory M. Mocko (USA)

Design decision support for the conceptual design Wim Zeiler, Perica Savanovic, Emile Quanjel (NL)

On the origin of evolvable systems: Evolvability or extinction *P. Daniel Borches, G. Maarten Bonnema (NL)*

From consumption to use - Consumer requirements in functional sales *Oskar Rexfelt, Viktor Hiort af Ornäs (S)*

Solar energy based product innovation Han Brezet, Daphne Geelen (NL)

Integral conceptual building design workshops Wim Zeiler, Perica Savanovic, Emile Quanjel (NL)

Identification of design strategy for of cookware products in Indian multi cultural context

Pratul Chandra Kalita, Amarendra Kumar Das (IN)

Refining product design through rapid prototype functional tests Mehdi S. Mahdavian, Sabu John, Fugen Daver, Quan Sheng Liu (AU)

Creative simulation in design processes Onno A. van Nierop, Pieter Jan Stappers (NL)

Poster cluster: Competitive product development

Improving the design of an over-wrapper using constraint modelling *Graham Neale, Tony Medland, Glen Mullineux (UK)*

An integrated mathematical model for twin-screw machines *Ahmed Kovacevic, Elvedin Mujic, Nikola Stosic, Ian K Smith (UK)*

Bayesian network analysis of risk evaluation of product innovation Shui Yee Wong, Kwai Sang Chin (HK), Da Wei Tang (UK)

Poly-optimization - A new paradigm in engineering design in mechatronics Wojciech Tarnowski, Tomasz Krzyżyński (PL)

Spatial model for multi-scale product design and simulation system *Kazuhiro Sakita (J)*

Dynamic analysis and optimization of the photovoltaic tracking systems using virtual prototyping tools

Cătălin Alexandru, Mihai Comșit (RO)

The role of hierarchical design models in the mechatronic product development process *Peter Hehenberger, Klaus Zeman (AT)*

Classification and investigation of methods of evaluation within the computational models of functional synthesis

Dioclecio Camelo (BR)

Simulation of radiant heating equations in IR dryer *Hossein Nouri (IR)*

Computer aided systematic design of machine tools Mustafa Bozdemir, Faruk Mendi, Yasin Kisioglu (TR)

Modeling and simulation in the design process of the thermal and mechanical highly loaded machinery parts made of fiber-reinforced silicon carbide *Eckart Schnack, Fengwen Wang, Tom-Alexander Langhoff, Aijun Li (D)*

Poster cluster: Enhancement of engineering processes

A robust, modular agent architecture with embeddable components for use in various multi-agent environments: Applying simulated robotics *Quintin J. Balsdon, Elizabeth M. Ehlers (ZA)*

A complete materials selection engine *Arlindo Silva, Elsa Henriques (PT)*

Federated patent harmonisation: An evolvable, agent-wise approach *Duncan A. Coulter, Elizabeth M. Ehlers (ZA)*

Experimental study of the effective parameters in polymeric coating of metal powder used as raw material in powder-based rapid prototyping Seyfollah Saedodin, Amin Mirahmadi, Yaser Shanjani, Toomaj R. Solemani(IR)

Towards active threat detection in systems storing critical data *Wai Sze Leung, Elizabeth M. Ehlers (ZA)*

What design processes predict better design outcomes? The case of robotics design teams

Noel Titus, Christian Schunn, Carolynn Walthall, George Chiu, Karthik Ramani (USA)

The computational study of flame radiation effect in non-premixed combustion Behnam Zakavi, Cyrus Aghanajafi, Hossein Sharifi (IR)

Taguchi optimization of steel tension during the blueprints of a bracing project *Eleftherios-Stamatios Telis, George Besseris, Constantinos Stergiou (GR)*

Global design, engineering and manufacturing taught via senior capstone curricula *Courtney Berglund, C. Greg Jensen (USA)*

Serial production line design by simulation modeling *Mehmet Savsar (KW)*

FACT: An Islamic model for excellence management *Hedayat Kargar Shouroki (IR)*

Poster cluster: Operation in virtual enterprises

Adding the society perspective to triple helix – The case of (European) Global Product Realization

Nuša Fain (SLO), Ellemieke van Doorn, Niels C. C. M. Moes (NL), Mihael Kline, Jože Duhovnik (SLO)

Automating collaboration through a specialised telemanufacturing environment *Justin R. Pike, Elizabeth M. Ehlers, Ockmer L. Oosthuizen (ZA)*

International technology transfer for Chinese manufacturers in Hong Kong/Pearl River Delta

Qiuling Dong, Kwai Sang Chin, Carmencita C. H. Cheung (HK)

Development of a self-assessment system for supply chain management in Hong Kong/Pearl River Delta manufacturing industry Jendy Pui Fun Leung, Kwai Sang Chin (HK)

How do multinationals develop products for emerging markets (BOP) *Johan Carel Diehl, Yu-Kuan Chang (NL)*

Influence of short cycle cryogenic treatment on mechanical properties of steel weldments

S. Mohamed Nazeer, M. Murugan, S. Rasool Mohideen, Y. V. N. Narasimma Moorthy (IN)

Forum cluster: Issues of design and engineering

East and West: What differences there are and how they affect our design *Shuichi Fukuda (J)*

Designer's role in product differentiation in the car industry *Michael Tovey (UK)*

Is it possible to follow a structured design methodology and to conduct unstructured creative design? *Yong Zheng (CA)*

FE simulation of crack formation on rubber surface in dry sliding friction *Nándor Békési, Károly Váradi (HU)*