

Table of Contents

Organizing Coomittee

Chapter 1: Light Weight Construction

| | |
|--|----|
| Accumulative Roll Bonding: Forming Behavior, Tailored Properties and Upscaling Approach M. Merklein and W. Böhm | 3 |
| Full Exploitation of Lightweight Design Potentials by Generating Pronounced Compressive Residual Stress Fields with Hydraulic Autofrettage H. Brünnet and D. Bähre | 17 |
| Tailored Strips by Welding, Strip Profile Rolling and Twin Roll Casting M. Daamen, D. Dávalos Julca and G. Hirt | 29 |
| Bulletproof and Noise-Reducing Guards in Lightweight Design for Woodworking Machines U. Heisel and V. Forcillo | 41 |
| Modeling and Simulation of the Machining of Unidirectional CFRP O. Pecat, R. Rentsch, M. Garbrecht and E. Brinksmeier | 55 |
| CVD Coated Diamond Tools for the Machining of Lightweight Materials E. Uhlmann and F. Sammler | 63 |
| Investigation of the Capability of Flux of Force Oriented Lattice Structures for Lightweight Design S. Teufelhart | 75 |
| CFRP-Aluminium Structures Realized by Laser Beam Joining Process V. Wottschel and F. Vollertsen | 89 |

Chapter 2: Enabling Mass Production

| | |
|---|-----|
| Total Flexibility in Forming Technology by Servo Presses J. Avemann, S. Calmano, S. Schmitt and P. Groche | 99 |
| Towards Mass Production of Smart Products by Forming Technologies M. Brenneis, M. Ibis, A. Duschka and P. Groche | 113 |
| Highly Flexible Final Production Stages - Taking Advantages of Scale Effects by Reducing Internal Component Variants M. Grigutsch, J. Nywlt, M. Schmidt and P. Nyhuis | 127 |
| Improving Efficiency in Robot Assisted Belt Grinding of High Performance Materials E. Uhlmann and F. Heitmüller | 139 |
| The Suitability of Analytical and Numerical Methods for Developing Clinching Processes with Thick Sheet Metal M. Israel | 151 |
| Aerodynamic Part Feeding Technology - Flexible High-Speed Part Provision for Mass Production K. Knüppel and P. Nyhuis | 165 |
| Analysis of Socio-Technical Structures in Order to Increase the Changeability of Producing Companies A. Kampker, P. Burggräf, T. Gartzen, A. Maue and D. Czarlay | 181 |
| Increasing Commonalities by Designing Production-Oriented Modular Product Platforms G. Schuh, S. Rudolf, J. Arnoscht and B. Lüdtkke | 197 |

Chapter 3: Medical and Micro Technology

| | |
|--|-----|
| Microstructuring of Surfaces for Bio-Medical Applications E. Brinksmeier, O. Riemer, L. Schönemann, H. Zheng and F. Böhmermann | 213 |
|--|-----|

| | |
|---|-----|
| Design, Development and Realisation of an Active Driven Knee-Prosthesis with Bevel Helical Gearbox | |
| B. Budaker and A. Verl | 225 |
| Development of a Manufacturing Process of Temporal Bone Surgery Models Using Rapid Prototyping | |
| B. Karpuschewski, J. Döring, M. Scheffler, G. Dietze, U. Vorwerk, C. Hahne and F. Klink | 241 |
| Production of Patient-Individual Hip Cups by Sheet Metal Forming: Simulation-Based Planning and Metal Forming Adapted Design Method | |
| B.A. Behrens, S. Betancur Escobar, A. Almohallami, N. Weigel, M. Vucetic, C. Stukenborg-Colsmann, M. Lerch, I. Nolte, K. Lucas, P. Wefstaedt and A. Bouguecha | 253 |
| Process Combination for the Manufacturing of Deep Holes with Small Diameters | |
| M. Kirschner, M. Heilmann and D. Biermann | 265 |
| Machine Integrated Measurement of Ultra Precision Machined Specular Non-Rotational Symmetrical Surfaces | |
| E. Uhlmann, G. Häusler, C. Röttinger, E. Olesch, C. Faber and M. Kurz | 277 |
| Work Space Surveillance of a Robot Assistance System Using a ToF Camera | |
| C. Ramer and J. Franke | 291 |
| Application of CAD/CAM and Micro End Mills with 20 to 120 µm Diameter for the Direct Machining of Microstructures in PMMA | |
| I.G. Reichenbach and J.C. Aurich | 299 |

Chapter 4: E-Mobility

| | |
|---|-----|
| Failure Mode Based Design and Optimization of the Electrode Packaging Process for Large Scale Battery Cells | |
| J. Schmitt and A. Raatz | 309 |
| Flexible Automation for the Production of Stators and Rotors of Electric Vehicles | |
| F. Risch, J. Tremel, T. Klier and J. Franke | 321 |
| Contribution of Body Lightweight Design to the Environmental Impact of Electric Vehicles | |
| G. Schuh, K. Korthals and J. Arnoscht | 329 |
| Potentials of Pulse Magnetic Forming and Joining | |
| E. Uhlmann, L. Prasol and A. Ziefle | 349 |
| Integrated Product and Process Model for Production System Design and Quality Assurance for EV Battery Cells | |
| G. Reinhart, J. Kurfer, M. Westermeier and T. Zeilinger | 365 |
| Strategic Fit: Overview of Cost, Quality and Scalability Impact on the Added Value Network in Electric Engine Production | |
| A. Kampker, P. Burggräf and C. Nee | 379 |
| Scenario-Based Development of Disassembly Systems for Automotive Lithium Ion Battery Systems | |
| C. Herrmann, A. Raatz, S. Andrew and J. Schmitt | 391 |

Chapter 5: Ressource Efficiency

| | |
|---|-----|
| Simulation and Prediction of Process-Related Power Consumption of Machine Tools | |
| U. Heisel and S. Braun | 405 |
| The Ecological Footprint on Product Level in Machining – From the Conceptual Methodology to the Industrial Application | |
| F. Klocke, B. Döbbeler, M. Binder and D. Lung | 417 |
| Development of a Numerical Method for Prediction of Wear on Shear Cutting Tools | |
| M. Liewald, M. Gall and R. Hank | 427 |
| Wear Protection of Deep Drawing Tools by Systematic Optimization of Highly Stressed Surfaces | |
| F. Klocke, D. Heinen, F. Schongen, K. Arntz, Y. Liu, V. Bäcker and B. Feldhaus | 439 |
| Factory Carbon Footprint Design | |
| A. Kampker, P. Burggräf, T. Welter, S. Kamp and J. Thul | 455 |
| Grinding of Riblet Structures on Free Formed Compressor Blades | |
| B. Denkena, J. Köhler and T. Krawczyk | 463 |

| | |
|---|-----|
| Lifecycle Oriented Assessment of Resource Efficiency in the Commercial Vehicle Industry R.C. Malak, M. Adam, S. Waltemode and J.C. Aurich | 475 |
| Adaptronic Form Honing – Manufacturing Methods for Compensating Cylinder Bore Distortions R. Neugebauer, C. Hochmuth and R. Schneider | 489 |