

ICAFT/SFU/AutoMetForm 2018

6th International Conference on Accuracy in Forming
Technology, 25th Saxon Conference on Forming Technology
and 6th International Lower Silesia-Saxony Conference on
Advanced Metal Forming Processes in the Automotive Industry

Procedia Manufacturing Volume 27

Chemnitz, Germany
6-7 November 2018

Editors:

Welf-Guntram Drossel
Reinhard Mauermann

Matthias Putz
Rafael Wertheim

ISBN: 978-1-5108-8046-7

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.

This work is licensed under a Creative Commons Attribution 4.0 International Licence. Licence details:
<http://creativecommons.org/licenses/by/4.0/>.

Printed by Curran Associates, Inc. (2019)

For additional 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: 845-758-2633
Email: curran@proceedings.com
Web: www.proceedings.com

TABLE OF CONTENTS

INCREMENTAL PROCESSES

SIMULATION METHODS FOR SKEW ROLLING	1
<i>C. Guillaume, A. Brosius</i>	
FORMING OF NON-AXISYMMETRIC PRODUCTS	7
<i>M. Pieszak, M. Rozmyslowicz</i>	
METHODOLOGY FOR THE DESIGN OF RECURSIVELY AXIALLY FORMED ROTOR SHAFTS MADE OF TWO OR MORE COMBINED SEGMENTS	13
<i>R. Kurth, R. Tehel, T. Päßler, H. Wagner, D. Beihofner</i>	
HIGH-SPEED INCREMENTAL FORMING – NEW TECHNOLOGIES FOR FLEXIBLE PRODUCTION OF SHEET METAL PARTS	21
<i>M. Linnemann, V. Psyk, E. Djakow, R. Springer, W. Homberg, D. Landgrebe</i>	
A HELICAL WEDGE ROLLING PROCESS FOR PRODUCING A BALL PIN	27
<i>Z. Pater, J. Tomczak, T. Bulzak, S. Martyniuk</i>	
PLASTIC DEFORMATION COMPONENTS IN MANDREL FREE INFEED ROTARY SWAGING OF TUBES	33
<i>Y. Liu, M. Herrmann, C. Schenck, B. Kuhfuss</i>	
PROFILE CROSS ROLLING FOR THE LOCAL HARDNESS INCREASE IN HELICAL COMPONENTS SUCH AS EXTRUDER SCREWS	39
<i>E. Forke, D. Landgrebe</i>	

NETWORKED PRODUCTION SYSTEMS, DIGITIZATION

GRAY BOX APPROACH FOR PREDICTION OF AIR BENDING	45
<i>V. Vorkov, G. C. Rodrigues, J. R. Dufloy</i>	
INVESTIGATION OF THE TRIBOLOGICAL BEHAVIOR OF CAR BODY PARTS IN SERIES PRODUCTION	51
<i>B. Hansen, S. Purr, J. Meinhardt, M. Merklein</i>	
PROCESS SURVEILLANCE IN HYDROFORMING BASED ON MACHINE LEARNING ALGORITHMS	57
<i>G. Steinhagen, A. Hoffmann</i>	
FORMING 4.0: SMART MACHINE COMPONENTS APPLIED AS A HYBRID PLAIN BEARING AND A TOOL CLAMPING SYSTEM	65
<i>R. Kurth, R. Tehel, T. Päßler, M. Putz, K. Wehmeyer, C. Kraft, H. Schwarze</i>	

INNOVATIVE MATERIALS AND SEMI-FINISHED PRODUCT

EVALUATION OF USING DISTRIBUTION FUNCTIONS FOR MEAN FIELD MODELLING OF MULTIPHASE STEELS	72
<i>D. Szeliga, Y. Chang, W. Bleck, M. Pietrzyk</i>	
DETERMINATION OF FORMING LIMIT CURVE BY FINITE ELEMENT METHOD SIMULATIONS	78
<i>D. Lumelskyj, J. Rojek, L. Lazarescu, D. Banabic</i>	
PLANETARY RIVETING OF ELECTRIC BIMETALLIC MICRO-CONTACTS	83
<i>W. Presz</i>	
MICROSTRUCTURAL ASPECTS OF ENERGY ABSORPTION OF HIGH MANGANESE STEELS	91
<i>M. B. Jablonska, K. Kowalczyk</i>	

ENSURING ADDED VALUE – INNOVATIONS IN FORMING TECHNOLOGY

PROPERTIES OF B-PILLAR MADE OF ALUMINIUM 7075 IN WARM FORMING PROCESS	98
<i>Zbigniew Gronostajski, Sławomir Polak, Karol Jaskiewicz, Paweł Kaczynska, Matusz Skwarski, Jakub Krawczyk, Władysław Chorzepa, Krzysztof Sliż, Sławomir Uzar</i>	

SENSOR PLACEMENT DESIGN STRATEGY AND QUALITY ESTIMATION IN MODERN CAR BODY PRODUCTION USING STOCHASTIC FINITE ELEMENT METHODS	104
<i>F. M. Neuhauser, R. Struck, H. Mautz, N. Manopulo, P. Hora</i>	

CONSIDERATION OF THE ENTIRE PROCESS CHAIN

NUMERICAL AND EXPERIMENTAL INVESTIGATIONS FOR HOT METAL GAS FORMING OF STAINLESS STEEL X2CRTiNB18	112
<i>F. Reuther, A. Mosel, P. Freytag, J. Lambarri, L. Degenkolb, M. Werner, S. Winter</i>	
PHYSICAL AND NUMERICAL SIMULATION OF THE MULTIPASS AHSS STRIP ROLLING, COOLING AND COILING	118
<i>L. Rauch, R. Jacolot, K. Bzowski, M. Pietrzyk</i>	

TOOLS FOR FORMING

SELECTED EFFECTIVE METHODS OF INCREASING THE DURABILITY OF FORGING TOOLS IN HOT FORGING PROCESSES	124
<i>Z. Gronostajski, M. Hawryluk, P. Widomski, M. Kaszuba, B. Nowak, S. Polak, M. Rychlik, J. Ziemia, M. Zwierzchowski</i>	
FLEXIBLE TOOLING FOR IMPULSE FORMING	130
<i>L. Langstädtler, H. Pegel, B. Beckschwarte, M. Herrmann, C. Schenck, B. Kuhfuss</i>	

JOINING BY FORMING

AUTOMATIC BEAD POSITION CALCULATION FOR HEM FLANGE BONDING	138
<i>M. Eckert, J. Weber, B. Hecht, W.-G. Drossel, M. Rössinger</i>	
RESEARCH ON SUSCEPTIBILITY OF 7075 ALUMINIUM ALLOY TO EXTRUSION WELDING	144
<i>D. Lesniak, K. Zaborowski, J. Madura, P. Gromek, B. Leszczynska-Madej, A. Woznicki, J. Zasadzinski, W. Libura, H. Jurczak</i>	
MANUFACTURING OF HYBRID GEARS BY INCREMENTAL SHEET-BULK METAL FORMING	152
<i>S. Wernicke, S. Gies, A. E. Tekkaya</i>	
POSSIBILITIES OF JOINING DIFFERENT METALLIC PARTS OF STRUCTURE USING FRICTION STIR WELDING METHODS	158
<i>R. E. Sliwa, P. Mysliwiec, R. Ostrowski, M. Bujny</i>	

PRIMARY SHAPING AND FORMING

MEDIA BASED FORMING AND INJECTION MOLDING BASED ON FIBER REINFORCED PLASTIC TUBES	166
<i>A. Albert, M. Werner, D. Landgrebe, W.-G. Drossel, M. Layer, U. Engelmann, L. Kroll</i>	
DEVELOPMENT OF AN INNOVATIVE LIGHTWEIGHT PISTON THROUGH PROCESS COMBINATION “CASTING – FORGING”	172
<i>L. Krüger, E. Jentsch, L. Brunke, A. Keßler, G. Wolf, T. Lehnert, N. Schubert, A. Wagner, D. Landgrebe</i>	

INTERACTION OF PROCESS AND MACHINE

MODELING ELASTIC BEHAVIOR OF FORMING MACHINE COMPONENTS TO REDUCE TOOL MANUFACTURING TIME	177
<i>R. Tehel, T. Päßler, M. Mihm</i>	
SCREENING-BASED EVIDENCE OF THE IMPACT OF GEOMETRICAL DEVIATIONS ON INNER STRESSES ON MECHANICAL PRESSES	185
<i>N. Wagner, T. Päßler</i>	

POSTER SESSION

**PRODUCTION PLANNING FOR OPTIMAL MASS PRE-DISTRIBUTION FOR AXIAL FEED
CROSS ROLLING** 192
N. Schubert, J. Steger, M. Gerlach, B. Lorenz

**NEW TOOL CONCEPT FOR THE ISOTHERMAL DETERMINATION OF FORMING LIMIT
CURVES AT TEMPERATURES ABOVE 600°C** 197
A. Graf, A. Rautenstrauch, V. Kräusel

**DEVELOPMENT OF NEW ALLOY SYSTEMS AND INNOVATIVE PROCESSING
TECHNOLOGIES FOR THE PRODUCTION OF MAGNESIUM FLAT PRODUCTS WITH
EXCELLENT PROPERTY PROFILE** 203
M. Ullmann, K. Kittner, T. Henseler, A. Stöcker, U. Prah, R. Kawalla

Author Index