

International Deep-Drawing Research Group Conference (IDDRG 2022)

IOP Conference Series: Materials Science and Engineering
Volume 1238

Lorient, France
6 - 10 June 2022

Editors:

**Sandrine Thuillier
Vincent Grolleau
Herve Laurent**

ISBN: 978-1-7138-5439-5
ISSN: 1757-8981

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 3.0 International Licence.
Licence details: <http://creativecommons.org/licenses/by/3.0/>.

No changes have been made to the content of these proceedings. There may be changes to pagination and minor adjustments for aesthetics.

Printed with permission by Curran Associates, Inc. (2022)

For permission requests, please contact the Institute of Physics
at the address below.

Institute of Physics
Dirac House, Temple Back
Bristol BS1 6BE UK

Phone: 44 1 17 929 7481
Fax: 44 1 17 920 0979

techtracking@iop.org

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

41st International Deep Drawing Research Group (IDDRG) conference	
Peer Review Statement	
Identification Protocol of Yoshida-Uemori Hardening Model.....	1
<i>X Lemoine, Q Chichery, J M Devin, P Duroux</i>	
Transient Hardening and R-value Behavior in Two-step Tension and Loading Reversal for DP980 Sheet.....	10
<i>M Kim, J Ha, J McNally, Y P Korkolis</i>	
New approach for the identification of anisotropy material parameters using hydraulic bulge tests	17
<i>A Khalfallah, SA Zoueghi, JV Fernandes</i>	
Non-Quadratic Pseudo Dual Potentials for Plastic Flow Modeling	27
<i>Seung-Yong Yang, Jie Sheng, Wei Tong</i>	
Numerical analysis of AISI 321 alloy material parameters on rubber pad diaphragm forming	37
<i>P S Barros, N Otegi, L Galdós, E Sáenz de Argandoña</i>	
Plasticity and fracture of AA7075 at elevated strain rates and temperatures	46
<i>X Li, C C Roth, K Pandya, N Karathanasopoulos, D Mohr</i>	
Implicitization of the Vegter Yield Criterion	53
<i>J Sheng, S-Y Yang, W Tong</i>	
Die Concepts and formability for simultaneous forming of sheet metals and FRPs	63
<i>X F Fang, T Kloska, A Hajdarevic</i>	
Investigation of the tensile response and the microstructural evolution during hot drawing of multi-layered, ultrafine-grained AA6014 sheets by thermomechanical analyzes	73
<i>B Zettl, M Merklein</i>	
Investigation of the impact of process parameters on the layer formation of AlSi coated boron-manganese steel	79
<i>F He, M Merklein</i>	
U-channel forming of an 7075-T6 in warm conditions	87
<i>S Royne, H Laurent, A Maillard</i>	
Superplastic behaviour of AA5083 sheets in the presence of an oscillating load	94
<i>M S Dastgiri, Z Fuerth, L Kiawi, E Rzyer, D E Green</i>	
Process Stability and Application of 1900 MPa Grade Press Hardening Steel with reduced Hydrogen Susceptibility	104
<i>D Rosenstock, T Gerber, C Castro Müller, S Stille, J Banik</i>	
Development of a process chain for multi-stage sheet metal forming of high-strength aluminium alloys	113
<i>J Günzel, J Hauß, C Gaedigk, J Bergmann, P Groche</i>	

Warping and springback reduction in bending of U-profiles through partial heating over the cross-section.....	122
<i>E. Hoffmann, F. Kolpak, A. E. Tekkaya</i>	
Upset bulging as a preforming operation for hot metal gas forming of 22MnB5 tubes	129
<i>A Alimov, R Haase, A Sviridov</i>	
Phenomenological-based constitutive modelling of warm deformation behavior of high-Strength lightweight AL-Li alloy sheets	139
<i>A Abd El-Aty, Y Xu, S H Zhang, X Guo, J Tao, M G Lee</i>	
Improved formability of HMGF components by preforming in an upset bulging process.....	146
<i>R Haase, M Werner, V Kräusel, A Alimov, A Sviridov, S Härtel</i>	
Less damage accumulation of aluminum alloy sheet during electromagnetic forming based on Gurson-Tvergaard-Needleman model	154
<i>W Liu, H Zhou, Z Meng, J Li, S Huang</i>	
Numerical analysis of a backward flow forming operation of AA6061-T6 and comparison with experiments	164
<i>K Mocellin, M A Vidal, F Frascati, P O Bouchard</i>	
Comparison of three different ductile damage models for deep drawing simulation of high-strength steels	173
<i>B-A Behrens, D Rosenbusch, H Wester, P Althaus</i>	
3D fracture modeling based on the coupling between damage criteria, phase field and crack propagation	181
<i>P-O Bouchard, H Eldahshan, D Pino Munoz, J Alves, E Perchat</i>	
Experiments on forming behaviour of the aluminium alloy AA6016	188
<i>R. Norz, F.R. Valencia, S. Gerke, M. Brünig, W. Volk</i>	
Analytical approach to damage prediction in incremental sheet metal forming.....	195
<i>Sahil Bharti, Deepu Raneesh, Hariharan Krishnaswamy, Sushanta Kumar Panigrahi</i>	
A case study of mechanical and thermal fatigue of press hardening dies.....	207
<i>K Chantziara, F Javadzadeh Kalahroudi, J Bergström, M Grehk, P Ulfberg</i>	
Formability of roll-formed carbon fibre reinforced metal hybrid components and its experimental validation.....	217
<i>X Hu, C Creighton, P Zhang, N Müller, T Reincke, R Taube, M Weiss</i>	
Improvement of shear cutting process by stress superposition via cross-elastic partholder	224
<i>D Briesenick, M Liewald, S Senn</i>	
Determination of temperature dependence in Modified-Mohr-Coulomb failure model for process simulation of shear cutting	233
<i>B-A Behrens, K Brunotte, H Wester, C Kock, D Kildonaviciute</i>	
Sheared edge formability characterization of cold-rolled advanced high strength steels for automotive applications	241
<i>A Lara, D Frómeta, S Parareda, D Casellas, P Larour, J Hinterdorfer, E Atzema, M Heuse</i>	
Blanking of Stainless Steel.....	251
<i>I Pätzold, P Tröber, M Welm, W Volk</i>	

A Study of the Boundary Conditions in the ISO-16630 Hole Expansion Test.....	261
<i>A Barlo, M Sigvant, L Pérez, M S Islam, J Pilthammar</i>	
Modelling stamped edges in FEM breakage analyses of high-strength steel safety components.....	269
<i>R A Lingbeek, D Schalk-Kitting, P Gruschka, M Uurike, P Peetsalu, P Blome</i>	
Reduction of adhesive wear with use of tool coating reducing thermoelectric currents.....	279
<i>A Schrepfer, A Schott, P Tröber, M Keunecke, M Welm, F Steinlehner, R Golle, W Volk</i>	
Prediction of sheared edge characteristics of advanced high strength steel.....	289
<i>O Sandin, S Hammarberg, S Parareda, D Frómeta, D Casellas, P Jonsén</i>	
An approach to describe edge ductility	298
<i>V Kesti, M Folmerz, R Vierelä, P Rautio, R Ruoppa, P Plosila, A Kaijalainen</i>	
Design Guidelines for interlocked stator cores made of CoFe sheets.....	307
<i>D M Martin, F Bäcker, B Deusinger, C Kubik, P Gehringer, J Schröder, P Groche</i>	
Optimum blanking clearance choice method by an approach coupling experimental trials and simulations	316
<i>P Schreiber, J Rizk, M Rachik, A Maillard</i>	
Evaluation of hole expansion formability of high strength AA7075 alloy under varying temper conditions	328
<i>Kali Prasad, Abrar Salam Ebrahim, Hariharan Krishnaswamy, Uday Chakkingal, Dilip K. Banerjee</i>	
Measurement of edge fracture strain of dual-phase steels by in-plane bending test.....	337
<i>M Masoumi Khalilabad, E S Perdahcioğlu, EH Atzema, AH van den Boogaard</i>	
Sheared Edge Formability Characterization of High Strength Aluminum Alloys at Room and Elevated Temperatures using Hole Expansion Tests.....	345
<i>A Narayanan, R George, K Cheong, A Mohamadizadeh, C Shi, R Long, E Boettcher, A Weinschenk, S Huhn, M J Worswick, C Butcher</i>	
Stretch flangeability of AHSS automotive grades versus cutting tool clearance, wear, angle and radial strain gradients	354
<i>P Larour, J Hinterdorfer, L Wagner, J Freudenthaler, A Grünsteidl, M Kerschbaum</i>	
Adjustment of fracture locus to improve edge crack resistance	365
<i>Niloufar Habibi, Sebastian Münstermann</i>	
Modeling tension-compression asymmetry and failure anisotropy in bending operations of a magnesium alloy.....	373
<i>D Steglich, J Besson</i>	
Prediction of forming limit curve for AA6061-T6 at room and elevated temperatures	380
<i>Ahmed Kacem, Hervé Laurent, Sandrine Thuillier</i>	
An alternative time-based strategy for the evaluation of forming limits using optical experimental measurements	388
<i>Celalettin Karadogan, Marcel Görz, Mathias Liewald, Marco Bühler</i>	
Investigation on the formability of friction stir welded Al-TWB through incremental forming	398
<i>Shubham, Kiran K Nayak, Pilli J Teja, Rahul Jain, Kaushik Bandyopadhyay</i>	

Deep drawing of DC06 at high strain rates	407
<i>M Tulke, E Galiev, V Psyk, V Kräusel, A Brosius</i>	
Post necking evaluation of the tensile test using artificial neural networks	415
<i>F Hakenbeck, R Lafarge, A Brosius</i>	
Development of a high-temperature double-layer bulge test for failure prediction in gas-based hot forming of a high-strength aluminium alloy	423
<i>T Teeuwen, N K Baru, K J Tilly, D Bailly, G Hirt</i>	
Accurate plane strain compression test validation.....	432
<i>Adriana Neag, Qifan Hu, Tudor Balan</i>	
Influence of criteria on the determination of forming limits in thickness reduced cruciform specimens	438
<i>Z Wang, D Guines, L Leotoing</i>	
Axisymmetric V-Bending of Sheet Metal: Determining the Fracture Strain and the Weakest Material Direction for Plane Strain Tension in One Test	446
<i>T Beerli, V Grolleau, D Mohr, C C Roth</i>	
On the use of elliptical bulge tests in material characterization through inverse methodologies	455
<i>M Rossi, A Lattanzi</i>	
Hot tensile and expansion tests of Ductibor®1000 steel	463
<i>N Demazel, A Boyer, H Laurent, M C Oliveira</i>	
On the topology design of a mechanical heterogeneous specimen using geometric and material nonlinearities	471
<i>M Gonçalves, A Andrade-Campos, S Thuillier</i>	
A relative approach for uncertainty quantification of inversely identified material behavior using a heterogeneous test for sheet metal.....	481
<i>M Conde, S Coppieters, A Andrade-Campos</i>	
Characterization of elasto-plastic transition of sheet metal by using large-scale four-point bending test	491
<i>W Liegard, L Tabourot, P Balland</i>	
On the use of the Gleeble® test as a heterogeneous test: sensitivity analysis on temperature, strain and strain rate	500
<i>B. Coelho, S. Thuillier</i>	
On the inverse identification methods for forming plasticity models using full-field measurements	510
<i>A Andrade-Campos, N Bastos, M Conde, M Gonçalves, J Henriques, R Lourenço, J M P Martins, M G Oliveira, P Prates, L Rumor</i>	
Investigation on tool properties for the production of components with micro textured surfaces.....	522
<i>M Reck, M Merklein</i>	
An industrial application case to predict galling in hot stamping processes.....	528
<i>S Berahmani, L Bruinekreeft, A Güner, J Venema, M Sigvant</i>	
TriboForm® software evaluation for ArcelorMittal Steel Products	536
<i>A Bouzid, H Bour</i>	

Investigation of frictional behavior of steel and aluminum at different temperatures	542
<i>G Huang, F Fenton</i>	
Metamodeling of a deep drawing process using conditional Generative Adversarial Networks	550
<i>Patrick Link, Johannes Bodenstab, Lars Penter, Steffen Ihlenfeldt</i>	
A data-driven methodology for separately quantifying the effects of tool wear of upper and lower tool on the quality of cut surfaces in shear cutting processes	559
<i>S Niessner, M Liewald</i>	
Optimisation of deep drawn corners subject to hot stamping constraints using a novel deep-learning-based platform.....	569
<i>H R Attar, N Li</i>	
Towards a real-time tool state detection in sheet metal forming processes validated by wear classification during blanking.....	579
<i>C Kubik, D A Molitor, M Rojahn, P Groche</i>	
Predicting Dynamic Process Limits in Progressive Die Sheet Metal Forming	593
<i>D Budnick, A Ghannoum, F Steinlehner, A Weinschenk, W Volk, S Huhn, W Melek, M Worswick</i>	
Field meta modelling for process design in complex sheet metal forming.....	603
<i>C Schwarz, S Kriechenbauer, R Mauermann, W G Drossel</i>	
Analysis of Distributed-Ledger-Technology for the Exchange of Design, Production and Simulation Data in Roll Forming	611
<i>B Kohl, M Krüger, T Dietl, M Lechner, E Trunzer, M Merklein, A Sedlmaier, B Vogel-Heuser</i>	
Control of draw-in in the deep-drawing process by regulating the force on the blank holder.....	621
<i>M E Palmieri, L Tricarico</i>	
Digital Twins in deep drawing for virtual tool commissioning and inline parameter optimization	631
<i>Lars Klingel, Lars Penter, Philip Mayer, Steffen Ihlenfeldt, Alexander Verl</i>	
On the reliability of yield functions in deep drawing simulations.....	640
<i>H Ghiabakloo, N Manopulo, J Mora, B Carleer, A Van Bael</i>	
Influence of the forming process on springback.....	650
<i>U Durmaz, S Heibel, T Schweiker, A. Prabhakar, M Merklein</i>	
Automatic generation of 3d spiral tool path for incremental sheet metal forming of mechanical parts with complex geometry	660
<i>Sirine Frikha, Laurence Giraud-Moreau, Anas Bouguecha, Mohamed Haddar</i>	
Springback inhibition of Ti-6Al-4V sheet with impact hydroforming at room temperature.....	669
<i>H Li, Y Xu, S F Chen, H W Song, S H Zhang</i>	
Understanding the influence of servo-press kinematics on a sheet metal forming process using a simulation-based approach	676
<i>M Burlat, A Maillard</i>	
Assembly simulation development and validation project with industrial applications.....	684
<i>Fabrizio Tinti, Marco Fontana, Leonardo Daniela Scintilla, Annalisa Mirabile, Bart Carleer</i>	

Evaluating the influence of the deformation of the forming tools in the thickness distribution along the wall of a cylindrical cup	691
<i>M C Oliveira, D M Neto, A.F.G. Pereira, J L Alves, LF Menezes</i>	
A novel incremental sheet metal forming process for long and open section profiles	701
<i>A Essa, B Abeyrathna, B Rolfe, M Weiss</i>	
Quantitative Surface Quality Assessment of Car Outer Panels with a Virtual Light Room.....	709
<i>Frédéric Guillon, Arthur Camanho, Renan Padovani, Jorge Gripp, Carlos Sakuramoto</i>	
Advanced part design method for springback minimization of stamped sheet metal car body components.....	718
<i>A Birkert, B Hartmann, M Nowack, A Petker, M Scholle, P Zimmermann, T. Kraft</i>	
Advanced Springback Compensation Strategy through elimination of avoidable elastic strain energy	725
<i>A Birkert, P Zimmermann, B Hartmann, M Nowack</i>	
Evaluation of testing methods for the characterization of material properties under plane strain	733
<i>M Lenzen, M Merklein</i>	
Superposing tensile stresses into single point incremental forming to affect martensitic transformation of SS304.....	741
<i>E M Mamros, F Maaß, M Hahn, A E Tekkaya, J Ha, B L Kinsey</i>	
Design of a simple shear test for large strains with sequential re-machining of the specimen edges.....	749
<i>Xavier Colon, Morwan Adlafi, Bertrand Galpin, Laurent Maheo, Vincent Grolleau</i>	
Effect of Initial Temper on the Warm Forming Characteristics of a High Strength 7000-series Al-Zn-Mg-Cu Alloy.....	757
<i>S DiCecco, M Di Ciano, C Butcher, M Worswick</i>	
Simulations of plastic deformation by anisotropic hardening yield functions for QP1180	767
<i>Zhe Chen, Yanshan Lou</i>	

Author Index