

## PROGRAMME OF THE CONFERENCE

### Day 1, Sunday, May 19, 2019

Time	Event	Room / Info
18:45–21:00	<b>Registration and Ice Breaker Party</b>	Hall

### Day 2, Monday, May 20, 2019

Time	Event	Room / Info
8:00–...	<b>Registration</b>	Hall
9:00–11:00	<p><b>Opening Ceremony</b></p> <p>Session Chair: Adam Hamrol</p> <ul style="list-style-type: none"> <li>• Conference Opening</li> <li>• Plenary Session</li> </ul> <p><b>Keynote Speakers:</b></p> <p>Cezary Tadej, Volkswagen Company  <i>Volkswagen Poznań – our way to Industry 4.0</i></p> <p>Jose Machado, University of Minho  <i>Production systems on the context of I4.0</i></p>	CW4 Aula Magna
11:00–11:45	Coffee Break	053
11:45–13:15	<p><b>Session 1.1 Materials Engineering</b></p> <p>Session Chair: Aminul Islam</p> <ol style="list-style-type: none"> <li>1. Milena Kubisova, Vladimir Pata, Libuse Sykorova, Maria Frankova, <i>Statistical Comparison of Original and Replicated Surfaces</i></li> <li>2. Jacek Andrzejewski and Marek Szostak, <i>Preparation and characterization of the injection molded polymer composites based on natural/synthetic fiber reinforcement</i></li> <li>3. Marek Szostak and Natalia Tomaszewska, <i>Mechanical and thermal properties of rotational molded PE/flax and PE/hemp composites</i></li> <li>4. Dagmar Měřínská, Vladimír Pata, Libuše Sýkorová, Oldřich Šuba and Milena Kubišová, <i>Clay/EVA Copolymer Nanocomposite - processing and properties</i></li> <li>5. Piotr Mikołajczak, Jerzy Janiszewski, Jacek Jackowski and Marek Szostak, <i>Construction of the facility for aluminium alloys electromagnetic stirring during casting</i></li> <li>6. Mateusz Wirwicki, <i>The impact of long-term environmental conditions on the lifetime prediction (S-N) of biomaterial used in dentistry</i></li> </ol>	L121

11:45–13:15 **Session 1.2 Advanced Manufacturing Technologies**

Session Chair: Sławomir Klos,  
Justyna Patalas-Maliszewska

1. Manpreet Singh and Sarbjit Singh, *Micro-Machining and Process Optimization of Electrochemical Discharge Machining (ECDM) Process by TOPSIS Method*
2. Dušan Šuťák, Michal Hatala, Jozef Zajac, Svetlana Radchenko, Vitalii Ivanov and Zuzana Mitaľová, *Simulation of Air Flow on the Bodywork Automobile with Direct and Side Load*
3. Jakub Svoboda, Jan Kudláček, Viktor Kreibich and Stanislav Legutko, *Corrosion resistance of alternative chemical pre-treatments of hot-dip galvanized zinc surface*
4. Marcin A. Królikowski and Marta Krawczyk, *Does metal additive manufacturing in Industry 4.0 reinforce the role of subtractive machining?*
5. Janos Kundrak, Angelos Markopoulos, Nikolaos Karkalos and Tamas Makkai, *The examination of cutting force as function of depth of cut in cases with constant and changing chip cross section*
6. Gyula Varga, Bogdan Sovilj, Michal Jakubowicz and Matej Babic, *Experimental Examination of Surface Roughness in Low-environmental-load Machining of External Cylindrical Workpieces*

L123

11:45–13:15 **Session 1.3 Continuous improvement and quality control**

Session Chair: Beata Starzyńska

1. Matthew Barsalou and Adam Hamrol, *Approaches to Design for Six Sigma. A Confusing Redundancy*
2. Agnieszka Terelak-Tymczyna, Agata Biniek and Monika Nowak, *The use of simulation games in teaching Lean Manufacturing*
3. Ewa Marjańska, Piotr Grudowski and Anna Wendt, *Assessment of the small enterprise's maturity to improvement projects based on the Lean Six Sigma concept*
4. Łukasz Łampika, Anna Burduk and Tomasz Chlebus, *A model of production process stability measurement and control with use of Shewhart control charts*
5. Marcelo T. Okano, Graziela Bizin Panza, Jaqueline Gomes, Eliane Antonio Simões, *The role of the recycling cooperatives in reverse logistics*
6. Adam Górny, *Improvements in the Production Environment Made Using Quality Management Tools*

CW7

13:15–14:15 Lunch

053

14:15-15:45 **Session 2.1 Mechanical engineering**

Session Chair: Michał Wieczorowski

1. Alejandro Pereira, Teresa Prado, Maria Fenollera, Michał Wieczorowski, Bartosz Gapiński and Thomas G. Mathia, *Influence of cutting conditions in the topography of texturized surfaces on Aluminium 7075 plates produced by robot machining*
2. M Kumaran, K Balamurugan, M Uthayakumar, Adam Słota and Jerzy Zając, *Potential studies of Waterjet Cavitation Peening on Surface Treatment, Fatigue and Residual Stress*
3. Neeraj Ahuja, Uma Batra, Kamal Kumar and Sudhir Kumar Garg, *Fabrication of Biodegradable Mg alloy bone scaffold through Electrical Discharge  $\mu$ -drilling route*
4. Abdul'Azeez Aliyu, Ahmad Abdul-Rani, Turnad Ginta, Chander Praksah, Tadimalla Rao and Eugen Axinte, *Synthesis and characterization of bioceramic oxide coating on Zr-Ti-Cu-Ni-Be BMG by electro discharge process*
5. Dominik Rybarczyk, *Investigations of electronic controller for electrohydraulic valve with dc and stepper motor*

L121

14:15-15:45 **Session 2.2 Automation and Robotics**

Session Chair: Olaf Cizak

1. Tomasz Kapłon and Andrzej Milecki, *Localization of Passive RFID Tags by Small Cartesian Robot*
2. Renata Ferduła, Tomasz Walczak and Szczepan Cofta, *The Application of Artificial Neural Network in Diagnosis of Sleep Apnea Syndrome*
3. Leszek Chałko, Paweł Maciąg and Mirosław Rucki, *Application of acoustic emission signals pattern recognition for a firearm identification*
4. Tomáš Dodok and Nadežda Čuboňová, *Application of Strategy Manager Tools for Optimized NC Programming*
5. Bartłomiej Gładysz and Aldona Kluczek, *An Indicators Framework for Sustainability Assessment of RFID Systems in Manufacturing*

L123

14:15-15:45	<b>Session 2.3 Materials Engineering</b> <b>Session Chair: Marek Szostak</b> 1. Ciprian I. Rizescu, Daniel Besnea, Dana Rizescu, Edgar Moraru and Victor Constantin, <i>Mechanical analysis of leaf springs realized by additive technologies</i> 2. Hana Hrdinova, Viktor Kreibich, Jan Kudláček and Jakub Horník, <i>Hydrogen embrittlement after surface treatments</i> 3. Aminul Islam, Xiaoliu Li and Maja Wirska, <i>Injection Moulding Simulation and Validation of thin wall components for precision applications</i> 4. Danuta Matykiewicz and Maciej Bogusławski, <i>Hybrid epoxy composites reinforced with flax fiber and basalt fiber</i> 5. Jacek Nabiątek and Tomasz Jaruga, <i>Numerical modeling of MuCell® injection moulding process</i>	CW7
15:45-16:15	Coffee Break	053
16:15-17:45	<b>Session 3.1 Enabling tools and education for Industry 4.0</b> <b>Session Chair: Dorota Stadnicka</b> 1. Dario Antonelli and Khurshid Aliev, <i>Analysis of cooperative industrial task execution by mobile and manipulator robots</i> 2. Antonio Maffei, Eleonora Boffa and Cali Nuur, <i>An ontological framework for the analysis of constructively aligned educational units</i> 3. Paweł Litwin and Dorota Stadnicka, <i>Computer Modelling and Simulation in Engineering Education: Intended Learning Outcomes Development</i> 4. Teresa Taurino and Agostino Villa, <i>A framework for SME performance evaluation</i> (Dario Antonelli) 5. Vasiliki Liagkou and Chrysostomos Stylios, <i>A case Study of a Virtual Training Environment</i> 6. Vladimir Modrak, Zuzana Soltysova, Pavol Semanco, Pandian R. Sudhakara., <i>Production Scheduling and Capacity Utilization in Terms of Mass Customized Manufacturing</i>	L121

16:15–17:45 **Session 3.2** Virtual and Augmented Reality  
in Manufacturing

Session Chair: Filip Górski

1. Francisco Torres-Guerrero, Leticia Neira-Tovar and Luis Martin Torres-Treviño, *An Introductory Training for Welding Workshop: A Biometric Evaluation Using Virtual Reality Scenes to Improve Practice*
2. Sumin Kim, Krzysztof Izdebski and Peter König, *The effectiveness of multimodal sensory feedback on VR users' behavior in an L-collision problem*
3. Karol Miądlicki and Mateusz Saków, *LiDAR Based System for Tracking Loader Crane Operator*
4. Filip Górski, Paweł Buń, Przemysław Zawadzki and Radosław Wichniarek, *Knowledge Management in Open Industrial Virtual Reality Applications*
5. Magdalena Żukowska, Paweł Buń, Filip Górski and Beata Starzyńska, *Cyber sickness in industrial Virtual Reality training*
6. Krzysztof Walczak, Jakub Flotyński, Dominik Strugała, Dariusz Rumiński, Mikołaj Maik, Anna Englert and Tomasz Jenek, *Virtual and Augmented Reality for Configuring, Promoting and Servicing Household Appliances*

L123

16:15–17:45 **Session 3.3** The changing face of production engineering  
and management in a contemporary business landscape

Session Chair: Damjan Maletič

1. Matthias Brönnner, Valerie Baumgartner and Markus Lienkam, *Requirements Engineering for Production Transfer to Developing Countries*
2. Benjamin Urh, Maja Zajec, Tomaž Kern and Eva Krhac, *Structural indicators for business process redesign efficiency assessment*
3. Mehmet Cakmakci, *Interaction in project management approach within Industry 4.0*
4. Damjan Maletic, Matjaz Maletic, Basim Al-Najjar and Bostjan Gomiscek, *Examination of the mediating effects of physical asset management on the relationship between sustainability and operational performance*
5. Viktor Ervin Troha, Tomaž Kern and Matjaž Roble, *Challenges of Calculations for the Contract Individual Production of Welded Structures*
6. Andrzej Mróz, *Implementation of EPM Methodology in Production Plants*

CW7

19:30–23:00 Gala Dinner

053

**Day 3, Tuesday, May 21, 2019**

<i>Time</i>	<i>Event</i>	<i>Room / Info</i>
9:00–10:00	<b>Poster Session with Breakfast and Morning Coffee</b>	Hall
10:00–10:30	<b>100<sup>th</sup> Anniversary of Faculty of Mechanical Engineering and Management celebration</b>	CW 4 Aula Magna
10:30–11:30	<p><b>Plenary session</b>                      Session Chair: Adam Hamrol  <b>Keynote Speakers:</b>                      Sandra Heffernan, Textile Design Massey University, New Zealand  <i>Design and manufacturing systems: New Zealand’s novel perspectives</i>                      Josu Takala, University of Vaasa, Finland  <i>Validating a Decision Making Method basing on Technology and Knowledge Priorities for Sustainable Strategies for Innovative Start-ups</i></p>	CW 4 Aula Magna
11:30–12:00	Coffee Break	053
12:00–13:30	<p><b>Session 4.1 Collaborative Manufacturing and Management in the Context of Industry 4.0</b>                      Session Chair: Tomasz Walczak</p> <ol style="list-style-type: none"> <li>Justyna Patalas-Maliszewska and Nadine Schlueter, <i>Model of a Knowledge Management for System Integrator(s) of Cyber-physical Production Systems (CPPS)</i> (Amelie Karcher)</li> <li>Milena Markiewicz, Emilia Bachtiaik-Radka, Sara Dudzińska and Daniel Grochała, <i>Statistical Process Control Using LMC/MMC Modifiers and Multidimensional Control Charts</i></li> <li>Mateusz Molasy, Mariusz Cholewa, Maria Rosienkiewicz and Joanna Helman, <i>Total Innovation Management – Application in Large and Medium-size Manufacturing Enterprises in China</i></li> <li>Marek Magdziak and Chandima Ratnayake Ratnayake Mudiyansele, <i>Optimal Prioritization of the Model of Distribution of Measurement Points on a Free-Form Surface in Effective Use of CMMs</i></li> <li>Marcin Żółkoś, Roman Wdowik, R.M. Chandima Ratnayake, Witold Habrat and Janusz Świder, <i>Surface quality analysis after face grinding of ceramic shafts characterized by various states of sintering</i></li> <li>Jan Betta, Dorota Kuchta, Agnieszka Skomra and Tomasz Chlebus, <i>Applying Scrum in New Product Development Process</i></li> </ol>	L121

12:00–13:30 **Session 4.2 Intelligent Manufacturing Systems**

Session Chair: Ivan Pavlenko

1. Ivan Pavlenko, Vitalii Ivanov, Ivan Kuric, Oleksandr Gusak, Oleksandr Liaposhchenko, *Ensuring Vibration Reliability of Turbopump Units Using Artificial Neural Networks*
2. Justyna Patalas-Maliszewska, Adam Dudek and Sławomir Kłos, *The Automated Acquisition of Expert Knowledge using a Service Department as an Example*
3. Kamil Židek, Peter Lazorík, Ján Piteľ, Ivan Pavlenko and Alexander Hošovský, *Automated Training of Convolutional Networks by Virtual 3D Models for Parts Recognition in Assembly Process*
4. Peter Kostal, Andrea Mudriková, Daynier Rolando Delgado Sobrino, David Michal and Šimon Lecký, *Comparison of NC data preparation ways for drawingless production*
5. Danijela Pezer, *Increasing the production productivity with Artificial Bee Colony optimization method*
6. Radovan Holubek, Roman Ružarovský and Daynier R.D. Sobrino, *An innovative approach of industrial robot programming using Virtual Reality for the design of production systems layout*

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12:00–13:30 **Session 4.3 Tooling and Fixtures: Design, Optimization**

Session Chair: Vitalii Ivanov

1. Oleg Krol and Volodymyr Sokolov, *Parametric modeling of gear cutting tools*
2. Magomediemmin Gasanov, Alexey Kotliar, Yevheniia Basova, Maryna Ivanova and Olga Panamariova, *Increasing of Lathe Equipment Efficiency by Application of Gang-Tool Holder*
3. Marcin Pelic, Tomasz Bartkowiak and Andrzej Gessner, *Automated system for workpiece leveling on a machine tool*
4. Alexey Kotliar, Yevheniia Basova, Maryna Ivanova, Magomediemmin Gasanov and Ivan Sazhniev, *Technological Assurance of Machining Accuracy of Crankshaft*
5. Gennadiy Kostyuk, *Prediction of the microhardness characteristics, the removable material volume for the durability period, cutting tools durability and processing productivity depending on the grain size of the coating or cutting tool base material*
6. Oleg Krol and Volodymyr Sokolov, *Parametric modeling of transverse layouts for machine tool gearboxes*

CW7

13:30–14:30 Lunch

053

14:30–16:00 **Session 5.1** Advanced mechanics of systems, materials and structures

Session Chair: Tomasz Stręk

1. Jakub Kasprzak and Piotr Paczos, *The influence of imperfections on the strength and stability of cold-formed sigma channels with corrugated flanges*
2. Jakub Michalski and Tomasz Stręk, *Fatigue life of auxetic re-entrant honeycomb structure*
3. Tomasz Okulik, Paweł Dunaj, Marcin Chodźko, Krzysztof Marchelek and Bartosz Powalka, *Determination of dynamic properties of a steel hollow section filled with composite mineral casting*
4. Paweł Dunaj, Tomasz Okulik, Bartosz Powalka, Stefan Berczyński and Marcin Chodźko, *Experimental Investigations of Steel Welded Machine Tool Bodies Filled with Composite Material*
5. Paweł Dunaj, Beata Niesterowicz and Bartłomiej Szymczak, *Loader crane modal analysis using simplified hydraulic actuator model*
6. Andrzej Gessner, Paweł Łuszczewski and Krzysztof Starosta, *Verification of machine tool set-up stability using a simplified Wolfram Language-based model*

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14:30–16:00 **Session 5.2** Staff for the industry of the future

Session Chair: Maciej Szafrąński,  
Magdalena Graczyk-Kucharska

1. Alla Polyanska and Roman Psiuk, *Cognitive methods of manager behavior formation in the conditions of international enterprise activities*
2. Scott Erickson and Helen Rothberg, *Digitization and Intangible Assets in Manufacturing Industries*
3. Olena Hrybiuk, *Improvement of The Educational Process by the Creation of Centers for Intellectual Development and Scientific and Technical Creativity*
4. Erfan Babaei Tirkolaee, Alireza Goli and Gerhard-Wilhelm Weber, *Multi-Objective Aggregate Production Planning Model Considering Overtime and Outsourcing Options under Fuzzy Seasonal Demand*
5. Maciej Szafrąński, Marek Goliński, Magdalena Graczyk-Kucharska and Małgorzata Spychała, *Cooperation of education and enterprises in improving professional competences – analysis of needs*
6. Waldemar Jędrzejczyk, *Human-organization relation in perspective of industry 4.0*

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14:30-16:00	<b>Session 5.3 Advances in manufacturing, properties, and surface integrity of construction materials</b> <b>Session Chair: Szymon Wojciechowski</b> 1. Sara Dudzińska, Daniel Grochała, Emilia Bachtiaak-Radka and Stefan Berczyński, <i>Nonparametric assessment of surface shaping by hybrid manufacturing technology</i> 2. Witold Habrat, Wojciech Skóra, Jolanta Królczyk and Stanisław Legutko, <i>Effect of modification of mono-crystalline corundum grinding wheel on cutting forces in grinding of aluminum alloy 7075</i> 3. Witold Habrat, Monika Sala, Jolanta Krolczyk, Angelos P. Markopoulos and Stanislaw Legutko, <i>Modelling and analysis of cutting force components in turning process of commercially pure titanium Grade 2</i> 4. Stefan Dzionk, Bogdan Scibiorski and Wlodzimierz Przybylski, <i>Problems of flocking in strengthening shaft burnishing</i> 5. Jakub Czyżycki, Paweł Twardowski and Natalia Znojkiwicz, <i>Analysis of the geometry and surface of the knife blade after milling with a various strategies</i> 6. Przemysław Podulka, <i>The effect of dimple distortions on surface topography analysis</i>	CW7
16:00–16:30	<b>Closing session with coffee</b>	053
16:45–18.00	<b>Boat Float</b>	Meeting Point – at the entrance

## Day 4, Wednesday, May 22, 2019

Time	Event	Room / Info
9:00–12.30	<b>Company Tour – Volkswagen Września</b>	Meeting Point – at the entrance
11.00–14.30	(two independent groups)	at the entrance

## Presentation Guidelines

The official language of the event is English. Individual papers are grouped into thematic sessions. Each presentation is 15 minutes long. It is recommended to use 12 minutes to present and 3 minutes for open discussion/questions. The recommended file type to be used for presentations is PowerPoint or Portable Document Format (PDF). The presentation files should be brought on a USB. Speakers are requested to upload their presentation onto the session PC and report to the session chair 10 minutes before the start of the session. All presenters will be introduced to the audience by the session Chair.

Posters should be printed and brought by each author to the conference Registration Desk. The dimensions of the poster should be one page of A0 sized (841×1189 mm). At the appointed time, at least one of the authors is expected to be at their designated poster board(s) to answer questions and discuss their work with the Poster Session Chair and conference participants during the session.

## POSTER LIST

No	Authors	Poster Title
1.P	Olga Mysiukiewicz, Piort Jabłoński, Radomir Majchrowski, Robert Śledzik and Tomasz Sterzyński	<i>Frictional properties of <math>\alpha</math>-nucleated polypropylene-based composites filled with wood flour</i>
2.P	Paweł Szymański and Marcin Borowiak	<i>Evaluation of castings surface quality made in 3D printed sand moulds using 3DP technology</i>
3.P	Anita Uscilowska	<i>Temperature distribution in workpiece during flowdrill - numerical experiment based on meshless methods</i>
4.P	Przemysław Poszwa, Paweł Brzęk, Ilia Gontariew and Marek Szostak	<i>Influence of processing parameters on clamping force during injection molding process</i>
5.P	Jacek Kozłowski, Michał Jakimiuk, Michał Rogalewicz, Robert Sika and Jakub Hajkowski	<i>Analysis and control of high-pressure die-casting process parameters with use of Data Mining Tools</i>
6.P	Mateusz Barczewski, Paulina Wojciechowska and Marek Szostak	<i>Mechanical properties and structure of reactive rotationally molded polyurethane - basalt powder composites</i>
7.P	Lukasz Bernat	<i>Analysis of the application of gypsum moulds for casting strength samples of aluminium alloys</i>
8.P	Monika Knitter, Dorota Czarnecka-Komorowska, Natalia Czaja-Jagielska and Daria Szymanowska-Pawałowska	<i>Manufacturing and properties of biodegradable composites based on thermoplastic starch/ polyethylene-vinyl alcohol and silver particles</i>
9.P	Dorota Czarnecka-Komorowska, Karolina Wiszumirska and Tomasz Garbacz	<i>Manufacturing and properties of recycled polyethylene films with an inorganic filler by extrusion blow moulding method</i>
10.P	Jakub Hajkowski, Robert Sika, Zenon Ignaszak, Mieczysław Hajkowski and Paweł Popielarski	<i>Thermo-mechanical phenomena in aluminum alloy casting during cooling – experimental simulation</i>
11.P	Robert Sika, Adam Jarczyński and Arkadiusz Kroma	<i>Methodology of determination of key casting process parameters on DISA MATCH automatic moulding line affecting the formation of alloy-mould contact defects</i>
12.P	Muhammad Ghufuran, Ghulam Moeen Uddin, Awais Ahmad Khan, Hma Hussein, Khuram Khurshid and Syed Muhammad Arafat	<i>Comparative Experimental Investigation of Mechanical Properties and Adhesion of Low Temperature PVD Coated TiO<sub>2</sub> Thin Films</i>
13.P	Krzysztof Knop, Ewa Olejarz and Robert Ulewicz	<i>Evaluating and improving the effectiveness of visual inspection of products from the automotive industry</i>

<b>14.P</b>	Sadaqat Ali, Ahmad Majdi Abdul Rani, Khurram Altaf, Patthi Hussain, Chander Prakash and Krishnan Subramaniam	<i>Investigation of alloy composition and sintering parameters on the corrosion resistance and microhardness of 316L Stainless Steel alloy</i>
<b>15.P</b>	Alexander Sandulyak, Anna Sandulyak and Vera Ershova	<i>Possibility of Block Grouping of Magnetic Inspection Operations for Iron Impurities in Oils and Cutting Fluids</i>
<b>16.P</b>	Jakub Kopowski, Izabela Rojek, Dariusz Mikołajewski and Marek Macko	<i>3D printed hand exoskeleton - own concept</i>
<b>17.P</b>	Ewa Dostatni and Izabela Rojek	<i>Artificial Neural Network-Supported Selection Of Materials In Ecodesign</i>
<b>18.P</b>	Przemysław Niewiadomski, Agnieszka Stachowiak and Natalia Pawlak	<i>Technical culture maturity as a manifestation of implementation of lean management principles – situation in agricultural machinery sector</i>
<b>19.P</b>	Arkadiusz Kubacki and Andrzej Milecki	<i>Control of the 6-axis robot using a brain-computer interface based on Steady State Visually Evoked Potential (SSVEP)</i>
<b>20.P</b>	Przemysław Podulka	<i>Errors of surface topography parameter calculation in grinded or turned details analysis</i>
<b>21.P</b>	Marcin Białek, Dominik Rybarczyk, Andrzej Milecki and Patryk Nowak	<i>Artificial Hand controlled by a glove with a force feedback</i>
<b>22.P</b>	Jiří Kuchař and Viktor Kreibich	<i>Cleaning of internal surfaces</i>
<b>23.P</b>	Krzysztof Żywicki and Filip Osiński	<i>A Comparison of Production Time Calculation Methods for Customized Products Manufacturing</i>
<b>24.P</b>	Paulina Rewers, Krzysztof Żywicki and Jacek Diakun	<i>Comparison Study of Different Production Control Policies In Condition of Various Demand for Final Products</i>
<b>25.P</b>	Paulina Rewers, Anna Karwasz and Krzysztof Żywicki	<i>A Comparative Analysis of Various Production Organisation Forms on the Basis of Customised Manufacturing</i>
<b>26.P</b>	Marta Szczepaniak and Justyna Trojanowska	<i>Methodology of manufacturing process analysis</i>
<b>27.P</b>	Beata Starzyńska, Karolina Szajkowska and Magdalena Diering	<i>A study of raters' agreement in quality inspection with the participation of hearing disabled employees – continuation</i>
<b>28.P</b>	Agnieszka Kujawińska, Michał Rogalewicz, Karolina Szajkowska, Wiktor Piotrowski and Wojciech Parczewski	<i>Electronic nonconformities guide as a tool to support visual inspection</i>

<b>29.P</b>	Marta Grabowska, Mariusz Bożek, Marta Królikowska	<i>Analysis of Continuous Improvement Projects in the Production Company</i>
<b>30.P</b>	Andrzej Jardzioch and Mariusz Wojtalik	<i>A new algorithm for generating the material order in ERP systems</i>
<b>31.P</b>	Grzegorz Bocewicz, Izabela Nielsen and Zbigniew Banaszak	<i>Reference Model of a Milk-Run Delivery Problem</i>
<b>32.P</b>	Bartosz Gapinski, Michał Wieczorowski, Lidia Marciniak-Podsadna, Natalia Swojak, Michał Mendak, Dawid Kucharski, Maciej Szelewski and Aleksandra Krawczyk	<i>Use of white light and laser 3D scanners for measurement of mesoscale surface asperities</i>
<b>33.P</b>	Damian Krenczyk, Reggie Davidrajah and Bożena Skolud,	<i>Comparing two Methodologies for Modeling and Simulation of Discrete-Event based Automated Warehouses Systems</i>
<b>34.P</b>	Marcin Suszyński and Olaf Ciszak	<i>Selection of Assembly Sequence for Manual Assembly Based on DFA Rating Factors</i>
<b>35.P</b>	Stanisław Pabiszczak, Wojciech Ptaszyński and Roman Staniek	<i>The impact of manufacturing accuracy of selected components on contact stress in the eccentric rolling transmission</i>
<b>36.P</b>	Mehmet Cakmakci and Neslihan Demirel-Ortabas	<i>Performance measurement of SMED improved plastic injection molding production by using process capability analysis for attribute data</i>
<b>37.P</b>	Dávid Michal, Šimon Lecký, Peter Košťál and Štefan Václav	<i>Welding workstation planning with use of CAD software and simulation</i>
<b>38.P</b>	Ireneusz Zagórski and Monika Kulisz	<i>The influence of technological parameters on cutting force components in milling of magnesium alloys with PCD tools and prediction with artificial neural networks</i>
<b>39.P</b>	Michał Jakubowicz, Mirosław Rucki and Matej Babič	<i>Uncertainty of sine input calibration apparatus for the air gauges</i>
<b>40.P</b>	Józef Kuczmaszewski, Kazimierz Zaleski, Jakub Matuszak and Janusz Mądry	<i>Testing geometric precision and surface roughness of titanium alloy thin-walled elements processed with milling</i>
<b>41.P</b>	Dominika Lehocka, Jiri Klich, Jan Pitel, Lucie Krejci, Zdenek Storkan and Darina Duplakova	<i>Analysis of the pulsating water jet maximum erosive effect on stainless steel</i>
<b>42.P</b>	Darina Duplakova, Michal Hatala, Dusan Knezo, Frantisek Botko, Pavol Radic and Dusan Sutak	<i>Comparison of the weld quality created by metal active gas and shielded metal arc welding</i>
<b>43.P</b>	František Botko, Jozef Zajac, Andrej Czan, Svetlana Radchenko, Dominika Lehocka and Jan Duplák	<i>Influence of residual stress induced in steel material on eddy currents response parameters</i>

<b>44.P</b>	Magdalena Zawada-Michałowska and Paweł Pieśko	<i>Assessment of Machining Accuracy of a WaterJet Cutter by Test Workpiece Machining</i>
<b>45.P</b>	Peter Tirpak, Peter Michalik, Jozef Zajac, Vieroslav Molnar, Michal Petruš and Dušan Knežo	<i>Evaluation of the longitudinal roughness of the thin-walled cooler for the robot control system made using CAM programming.</i>
<b>46.P</b>	Wiesław Urban and Patrycja Rogowska	<i>Systematic literature review of Theory of Constraints</i>
<b>47.P</b>	Wiesław Urban and Elżbieta Krawczyk-Dembicka	<i>Technology Management as a Process – a View from In-Depth Studies in Metal Processing Companies</i>
<b>48.P</b>	Mohinder Pal Garg, Sarbjit Singh and Manpreet Singh	<i>Micro-Machining and Process Optimization of Electrochemical Discharge Machining (ECDM) Process by GRA Method</i>
<b>49.P</b>	Janos Kundrak, Viktor Molnar, Tamas Makkai and Tamas Dagi	<i>Analysis of material removal efficiency in face milling of aluminum alloy</i>
<b>50.P</b>	Rafał Kluz and Katarzyna Antosz	<i>Simulation of Flexible Manufacturing Systems as an element of education towards Industry 4.0</i>
<b>51.P</b>	Pedro Junior, Doriana D'Addona, Felipe Alexandre, Paulo Aguiar, Fabricio Baptista, Rodrigo Ruzzi and Eduardo Bianchi	<i>Impedance-based PZT Transducer and Fuzzy Logic to Detect Damage in Multi-point Dressers</i>
<b>52.P</b>	Joanna Gąbka	<i>Edge computing technologies as a crucial factor of successful Industry 4.0 growth. The case of live video data streaming.</i>
<b>53.P</b>	Sławomir Kłos and Justyna Patalas-Maliszewska	<i>Simulation Modeling of Assembly Processes for Digital Manufacturing</i>
<b>54.P</b>	Paweł Buń, Paulina Rewers and Justyna Trojanowska	<i>VR and AR in Lean Manufacturing Classes</i>
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<b>57.P</b>	Jan Lipiak and Mariusz Salwin	<i>The Improvement of Sustainability with Reference to the Printing Industry – Case Study</i>
<b>58.P</b>	Ana Simões, António Lucas Soares and Ana Cristina Barros	<i>Drivers impacting cobots adoption in manufacturing context: a qualitative study</i>
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<b>60.P</b>	Michał Adamczak, Łukasz Hadaś, Agnieszka Stachowiak, Roman Domański and Piotr Cyplik	<i>Characteristics of resources as a determinant of implementation of the Physical Internet concept in supply chains</i>
<b>61.P</b>	Mariana Martins, Maria Leonilde Rocha Varela, Goran Putnik, José Machado, Vijaya Kumar Manupati	<i>Tools Implementation in Management of Continuous Improvement Processes</i>
<b>62.P</b>	Ricardo M. P. Gonçalves, Maria L. R. Varela, Ana M. Madureira, Goran D. Putnik and Jose Machado	<i>Model Proposal to Evaluate the Quality of a Production Planning and Control Software in an Industrial Context</i>
<b>63.P</b>	Michal Balog, Hanna Sokhatska and Angelina Iakovets	<i>Intelligent systems in the railway freight management</i>
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