ICAMaT 2019

10th International Conference on Advanced Manufacturing Technologies

Book of Abstracts

&

Conference Programme

October 10th, 2019
Bucharest, Romania

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Conference Programme

Thursday, 10th of October 2019

Time: 08.30 – 11.30
Location: IIR Faculty main hall, CD building

Activities: ICAMaT 2019, ICNcT 2019 & POLCOM 2019 – participants' registration

Time: 09.00 – 09.30
Location: Room CD 016 - IIR Faculty

Celebration of 65 years of
> **Manufacturing Engineering Department (TCM)**

Opening ceremony of
> **ICAMaT 2019, ICNcT 2019 & POLCOM 2019 Conferences**

Welcome speech:

- ***Prof. Cristian DOICIN**, Dean of the Faculty of Industrial Engineering and Robotics (IIR), POLITEHNICA University of Bucharest, Romania*

- **Prof. Tom SAVU,** Head of Manufacturing Engineering Department (TCM), Faculty of Industrial Engineering and Robotics (IIR), POLITEHNICA University of Bucharest, Romania

- **Prof. Daniel GHICULESCU,** Manufacturing Engineering Department (TCM), Faculty of Industrial Engineering and Robotics (IIR), POLITEHNICA University of Bucharest, Romania

- **Prof. Constantin OPRAN**, Head of Composites Products Laboratory, Manufacturing Engineering Department (TCM), Faculty of Industrial Engineering and Robotics (IIR), POLITEHNICA University of Bucharest, Romania

Time: 09.30 – 11.30
Location: Room CD 016 - IIR Faculty

Presentations of Manufacturing Engineering Department (TCM) Partners

- *Metalix – advanced CAD-CAM for the sheet metal industry*, General Manager Vasile DUȚĂ and Eng. Cristian LAZĂR, AGO TRADE INTERNATIONAL

- *ALLIO GROUP – company presentation*, Senior HR Cristina BRIZIOU, ALLIO GROUP Romania

- *What's new in SolidWorks 2020*, General Manager Claudiu BÎRLOGEANU, CADWORKS International

- *FlexSim Software Products*, Director of International Distribution Krystian KOGUT and Marian CRETU, InterMarium

- *Esprit CAM Software Suite*, General Manager Dorin DASCĂLU, LOGICAD Solutions

Time: 11.30 – 11.45
Location: CO hall - IIR Faculty
Activities: Coffee break

Time: 12.00 – 13.30
Location: according to the conference programme (see below)
Activities: Paper presentations on sections

Time: 13.30 – 14.30
Location: CO hall - IIR Faculty
Activities: Lunch

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Time: 15.00 – 16.30
Location: according to the conference programme (see below)
Activities: Paper presentations on sections

Time: 16.30 – 16.45
Location: CO hall - IIR Faculty
Activities: Coffee break

Time: 19.00 – 24.00
Location: POTCOAVA restaurant

Activities: Gala Dinner

Book

of

abstracts

Section 1. Integrated Product Development

Section 1. Programme

Section 1 – Integrated Product Development
Room CK 104c / 12.00 - 13.30 / 15.00 - 16.30
Section Chairs: Andrei DUMITRESCU, Ionuț Gabriel GHINOEA

No. & Start time	Authors / *Paper title*
1. 12.00	Andrei Dumitrescu *Investigating the relationship between perceived quality and reliability of industrially-manufactured products and their supposed gender*
2. 12.15	Marius-Adrian Spiroiu and Mircea Nicolescu *On the estimation of the reliability probabilistic model of railway wheelset*
3. 12.30	Mihaela-Cristina Tudorache and Ionuț Neagoe *An analysis of vehicle - railway exchanger interaction*
4. 12.45	Mihaela-Cristina Tudorache, Razvan-Andrei Oprea and Ionuț Neagoe *Influence of spin creepage on contact patch*
5. 13.00	Dragoș Ionuț Stanică and Mădălina Dumitriu *Critical points numerical analysis of ride comfort of the flexible railway carbody*
6. 13.15	Gabriel Ionuț Ghionea, Adrian Lucian Ghionea, Saša Ćuković and Mihaela Ionica Pleșa *Analysis on the measurement results of the precision grades and their influence on the performance of the hydraulic pumps with spur gears*

13.30 - 14.30	Lunch – IIR Faculty CO hall
7. 15.00	Alexandra-Elena Crăciun *Strategic outlook in industrial design assessment based on product category*
8. 15.15	Traian Mazilu and Vlăduț-Marian Dinu *The vibration behaviour of a freight wagon in the presence of irregularities of the track*
9. 15.30	Mihai Eftimie, Ana Filip and Alexandra Banu *Theoretical calculus of the mechanical strength of binary oxide glasses*

Section 1. Abstracts

S1 - 1. Investigating the relationship between perceived quality and reliability of industrially-manufactured products and their supposed gender

Andrei Dumitrescu

University POLITEHNICA of Bucharest, Manufacturing Engineering Department, 313 Splaiul Independentei, District 6, Bucharest, Romania

Abstract. In an effort to help designers conceive market successful products, researchers have launched the concept of product personality. The relevance of the product personality concept resides in the personality congruence theory – people like products with a personality similar to theirs. Several product personality models have been developed, including one that divides the world of products into four categories: female, feminine, masculine and male. How effective is such a model? Can any product be considered gendered? Moreover, researchers and scholars have analysed the complex relationship between gendered objects and the persons to whom these objects are addressed, reaching a multitude of conclusions. What has not yet been studied is the relationship between the product's gender and the perceived quality and reliability of the product as viewed from the same gender consumer's perspective. This paper answers the above questions and analyses the unstudied relationship.

S1 - 2. On the estimation of the reliability probabilistic model of railway wheelset

Marius-Adrian Spiroiu[1] and Mircea Nicolescu[2]

[1]University POLITEHNICA of Bucharest, Department of Railway Rolling Stock, Splaiul Independenţei 313, Bucharest, Romania
[2]Romanian Railway Investigating Agency, Calea Griviţei 393, Bucharest, Romania

Abstract. In the present paper is made a comparison between various estimation methods for the reliability probabilistic model of the railway wheelset. The analysis is based on real field data, observed in actual operations of freight wagons. The Weibull distribution is used to model the reliability and the applied estimation methods are the Maximum Likelihood Method and the Regression Method.

S1 - 3. An analysis of vehicle - railway exchanger interaction

Mihaela-Cristina Tudorache[1] and Ionuţ Neagoe[2]

*[1]University POLITEHNICA of Bucharest, Department of Railway
Vehicles, Splaiul Independeţei 313, Bucharest, Romania
[2]University POLITEHNICA of Bucharest, Doctoral School of
Transports, Splaiul Independeţei 313, Bucharest, Romania*

Abstract. The fast variation of the section and contact characteristics of railway exchangers is a difficult matter for an analytical approach. At the same time, vehicle - railway exchanger system includes multiple contact patches, discontinuities in the contact points evolution and the necessity to compute stresses and deformations. As a consequence of the harrs working conditions in the system there is a permanent concern to improve its performance. The analysis of the state of art in the research indicated the need of a complex theory for the study of the mechanical contact. In the paper, a tridimensional analysis of the vehicle - railway exchanger contact patch is carried out using "Contact" software, based on Kalker's theory. The outcome of the study is the computation of tangential forces, creepage speeds and stresses distribution in the contact patches, in order to elucidate the vehicle evolution during this interaction and the estimation of the running safety.

S1 - 4. Influence of spin creepage on contact patch

Mihaela-Cristina Tudorache[1], Răzvan-Andrei Oprea[1] and Ionuț Neagoe[2]

[1]University POLITEHNICA of Bucharest, Department of Railway Vehicles, Splaiul Independeţei 313, Bucharest, Romania
[2]University POLITEHNICA of Bucharest, Doctoral School of Transports,, Splaiul Independeţei 313, Bucharest, Romania

Abstract. The wheel-rail contact patch analysis methods are related to the evolution of modern computers. Contemporary computation systems allow the approach of tri-dimensional methods which take into account various contact parameters. With this background in mind, the wheel-rail contact problem is a study under development. The paper proposes a tri-dimensional approach, considering the spin creepage parameters. The spin effect is due to the increase of the wear around the wheel flange and the gage face. At the same time, the spin is influenced by the wheel rolling operating conditions. The paper gives an insight of wear mechanisms analysis, plastic deformation and fatigue phenomenon of the contact patch constituent material.

S1 - 5. Critical points numerical analysis of ride comfort of the flexible railway carbody

Dragoş Ionuţ Stănică[1] and Mădălina Dumitriu[2]

[1]University POLITEHNICA of Bucharest, Doctoral School of Transports, Splaiul Independeţei 313, Bucharest, Romania
[2]University POLITEHNICA of Bucharest, Department of Railway Vehicles, Splaiul Independeţei 313, Bucharest, Romania

Abstract. Ride comfort is one of the criteria for evaluating the dynamic behaviour in railway vehicles, through which the complex sensation triggered by the vibrations in the railway vehicle carbody upon passengers is being described. The behaviour of vibrations along the vehicle carbody is not uniform and the point where the ride comfort is the least convenient can be considered as the carbody critical point. The paper examines the ride comfort along the carbody and the position of the ride comfort critical points in correlation with the speed, carbody flexibility and suspension damping. To this purpose, there are used the results from numerical simulations regarding the ride comfort index calculated along the carbody and the ride comfort index in three points deemed relevant in terms of evaluating the ride comfort at the center of carbody and above the bogies.

S1 - 6. Analysis on the measurement results of the precision grades and their influence on the performance of the hydraulic pumps with spur gears

Gabriel Ionuț Ghionea[1], Adrian Lucian Ghionea[2], Saša Ćuković[3] and Mihaela Ionica Pleșa[4]

[1]University POLITEHNICA of Bucharest, Manufacturing Engineering Department, 313 Splaiul Independentei, Bucharest, Romania
[2]University POLITEHNICA of Bucharest, Machine and Production Systems Department, 313 Splaiul Independentei, Bucharest, Romania
[3]Institute for Information Technologies, University of Kragujevac, Jovana Cvijica street, Kragujevac, Serbia
[4]University POLITEHNICA of Bucharest, Doctoral School of Industrial Engineering and Robotics, Splaiul Independeței 313, Bucharest, Romania

Abstract. The paper presents results of experimental measurements on the main precision grades for a cylindrical spur gearing, from the assembly of a hydraulic pump integrated in a hydrostatic driving system. For the components of this assembly, the main stages of the design, material characteristics, constructive, precision and functional parameters that define the flow, the pressure of the hydraulic environment, the driving speed are briefly presented. The analysis was performed based on the data obtained by measuring the gears' deviations and tolerances. Among these, the most important data for complying the optimal requirements of the pump operating criteria were retained and analysed. The analysis of the measured results highlighted the main causes and effects of the deviations found. The presented results show the problem's complexity and are important in evaluating the performances that characterize these types of pumps, with wide use in many fields of hydraulic actuators

S1 - 7. Strategic outlook in industrial design assessment based on product category

Alexandra-Elena Crăciun

University POLITEHNICA of Bucharest, Doctoral School of Industrial Engineering and Robotics, Splaiul Independeței 313, Bucharest, Romania

Abstract. Assessing industrial design is an intricate process of product analysis which aims to establish the quality degree of a product and considers all its implications from technical restrictions to appearance. Industrial design is related to mass produced articles obtained through industrial processes and whether products are articles of adornment or machines, both technical and aesthetic dimensions are relevant and influence the design process. All types of industrial products can be assessed using a numerical method based on the same criteria, however the same principles have a different impact on various types of products. The author proposes a customized approach in order to achieve an objective assessment for different concepts of design.

S1 - 8. The vibration behaviour of a freight wagon in the presence of irregularities of the track

Traian Mazilu[1] and Vlăduț-Marian Dinu[2]

[1]University POLITEHNICA of Bucharest, Department of Railway Vehicles, Splaiul Independeţei 313, Bucharest, Romania
[2]University POLITEHNICA of Bucharest, Doctoral School of Transports,, Splaiul Independeţei 313, Bucharest, Romania

Abstract. The paper presents an analysis of the behaviour of the vertical vibration of a freight wagon featured with dry friction dampers in suspension. To this end, the wagon model is reduced to an oscillator with two degrees of freedom corresponding to the suspended mass of the wagon and the wheel. The suspension has progressive characteristic in two steps according to the empty/loaded state. Coulomb's model is considered to model the dry friction damper. The vibration is induced by the track irregularity which is synthetized from an analytic spectrum. Vibration behaviour exhibits two different aspects: at low speed, the suspension is locked, and at high speed, the stick-slip vibration occurs. Acceleration of the suspended mass of the wagon and wheel-rail contact force increase along the speed. Wagon loaded state influences the wheel-rail contact force, but it has no impact upon the acceleration.

S1 - 9. Theoretical calculus of the mechanical strength of binary oxide glasses

Mihai Eftimie[1], Ana Filip[2] and Alexandra Banu[3]

[1]University POLITEHNICA of Bucharest, Faculty of Applied Chemistry and Materials Science, 1 Polizu, Bucharest, Romania
[2]National Institute for Laser, Plasma and Radiation Physics, 409 Atomistilor, Magurele, Romania
[3]University POLITEHNICA of Bucharest, Manufacturing Engineering Department, 313 Splaiul Independentei, Bucharest, Romania

Abstract. The mechanical strength of the glasses is determined by the strength of the established bonds between the different macro-anionic species, these bonds being the weaker compared to the covalent ones inside the macro-anionic species. In this paper is proposed a probabilistic relationship to calculate the theoretical mechanical strength of the SiO_2 glass and of some compositions in the $Na_2O \cdot SiO_2$ system, in good agreement with literature data.

Section 2. Flexible and Intelligent Manufacturing Systems

Section 2. Programme

Section 2 - Flexible and Intelligent Manufacturing Systems
Room CK 104b / 12.00 - 13.30 / 15.00 - 16.30
Section Chairs: Marian GHEORGHE, Tom SAVU

No. & Start time	Authors / *Paper title*
1. 12.00	Cosmin Grigoraș, Bogdan Chiriță, Gheorghe Brabie and Cătălina Ciofu *Experimental analysis of AZ31B magnesium alloy sheet failure using punch stretching*
2. 12.15	Marek Płaczek *Application of piezoelectric MFC type transducers in mechatronic measurement systems - the impact of a mechanical subsystem damage on a system operation*
3. 12.30	Cristian Dragomirescu and Victor Iliescu *Aspects on the study of nonlinear vibration phenomenon in friction welding with rotating active element*
4. 12.45	Carmen-Violeta Botezatu, Ionuț Condrea, Bogdan Oroian, Adelina Hrițuc, Mihaela Ețcu and Laurențiu Slătineanu *Use of the Ishikawa diagram in the investigation of some industrial processes*
5. 13.00	Daniel Cristea, Mihai Alin Pop, Costin Faraian and Daniel Munteanu *The influence of additive manufacturing parameters on the structural and mechanical properties of acrylonitrile butadiene styrene (ABS) parts produced by fused filament fabrication*

6. 13.15	Alexandra Nițoi, Daniel Cristea, Mihai Alin Pop, Tibor Bedo, Bela Varga and Daniel Munteanu *Aluminum based metastable alloys for additive manufacturing*	
13.30 - 14.30	Lunch – IIR Faculty CO hall	
7. 15.00	Cristian Pisarciuc *Assessing the influence of significative parameters used in 3D fused filament deposition*	
8. 15.15	Diana-Irinel Băilă, Sergiu Tonoiu, Mihai Cătălin Ștefan and Iasmin Șapadin *Experimental researches concerning the manufacture of multitool 3D printer, type DIY (do it yourself)*	
9. 15.30	Mirko Djapic, Predrag Popovic and Ljubomir Lukic *Lean business practice as support to QMS implementation in according to ISO 9001:2015*	
10. 15.45	Mădălin-Gabriel Catană, Manuela-Roxana Dijmărescu and Nicolae Tunsoiu *Process planning solution for increasing the productivity and robustness of work schedules for batch production processes*	
11. 16.00	Tom Savu and Bogdan Jugravu *Indoor path planning and obstacle avoidance simulation*	
12. 16.15	Alfred Tieber, Daniel Manolache and Marian Gheorghe *Development of key performance indicators modules for small and medium-sized enterprises in production industry*	

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Section 2. Abstracts

S2 - 1. Experimental analysis of AZ31B magnesium alloy sheet failure using punch stretching

Cosmin Grigoraş, Bogdan Chiriţă, Gheorghe Brabie and Cătălina Ciofu

Vasile Alecsandri University of Bacău, Industrial Engineering Department, Calea Mărăşeşti Street No. 157, Bacău, România

Abstract. The formability of magnesium alloy sheets at room temperature presents anisotropy in mechanical properties and difficulties in terms of occuring cracks easily, especially in regions with bend radius. In addition, the elastic spring-back is significant, leading to massive deviations from the desired shape. Recent studies conducted in this field lead to stretch forming magnesium alloys sheets using thermo-mechanical treatments at temperatures up to 400°C. The present study was conducted on 1 [mm] thick magnesium alloy AZ31B sheet to investigate its formability when stretching at room temperature by several dies with different radius. The stretching process was conducted on a hydraulic press, using 3D printed PLA dies with the following values: R180, R320, R540, R720, R900 and R1080. The samples were stretched until fracture to highlight the fracture force, distance to fracture, deviation from the die radius and bend angle.

S2 - 2. Application of piezoelectric MFC type transducers in mechatronic measurement systems - the impact of a mechanical subsystem damage on a system operation

Marek Płaczek

Silesian University of Technology, Faculty of Mechanical Engineering, Institute of Engineering Processes Automation and Integrated Manufacturing Systems, Konarskiego 18A, 44-100 Gliwice, Poland

Abstract. The work include a report of research works concerning applications of non-classical piezoelectric transducers in mechatronic measuring systems. Composite piezoelectric transducers called Macro Fiber Composite (MFC) are considered. Characteristics of considered transducers were made, indicating their advantages and disadvantages, as well as the results of carried out laboratory tests are presented, in which MFC transducers were used as sensors for mechatronic measurement systems. A series of laboratory tests was carried out on the created laboratory stand to determine the impact on the measured values of damage of the mechanical subsystem on which the MFC-type piezoelectric transducer was glued. Results of measurements are presented and analysed in relation to different applications of the piezoelectric MFC sensors.

S2 - 3. Aspects on the study of nonlinear vibration phenomenon in friction welding with rotating active element

Cristian Dragomirescu[1] and Victor Iliescu[2]

[1]University POLITEHNICA of Bucharest, Mechanics Department, 313 Splaiul Independentei, Bucharest, Romania
[2]University for Agronomical Sciences and Veterinary Medicine, Bucharest, Romania

Abstract. The friction welding with rotating active element is a complex process including heating of the materials using friction and plastic deformation generated by a tool that has both rotation and translation motions. The paper is analysing the nonlinear vibrations that occurs during the friction welding with rotating active element process, mainly due to the motion of the rotating element. Using the dynamic systems theory, the nonlinear equation of the motion is deduced and the motion characteristics are presented using specific qualitative methods. The results are contributing to a more accurate understanding of the phenomena, in this case the nonlinear vibrations, generated in the friction welding with rotating active element process, and to better performances of welding process.

S2 - 4. Use of the Ishikawa diagram in the investigation of some industrial processes

Carmen-Violeta Botezatu[1], Ionuţ Condrea[1], Bogdan Oroian[1], Adelina Hriţuc[2], Mihaela Eţcu[1] and Laurenţiu Slătineanu[3]

[1]*Ph.D. student, Gheorghe Asachi Tehnical University, Department of Machine Manufacturing Technology, Dimitrie Mangeron Blvd, Iaşi, Romania*
[2] *M.Sc. student, Gheorghe Asachi Tehnical University, Department of Machine Manufacturing Technology, Dimitrie Mangeron Blvd, Iaşi, Romania*
[3]*Gheorghe Asachi Tehnical University, Department of Machine Manufacturing Technology, Dimitrie Mangeron Blvd, Iaşi, Romania*

Abstract. The use of the Ishikawa diagram was proposed by Japanese professor Kaoru Ishikawa in the 1960s. The diagram must highlight the possible causes of a certain effect. In the research presented in this paper, the analysis method based on the design of the Ishikawa diagram was used to identify the factors able to ensure the adequate development of some investigations concerning certain industrial processes. It was found that various criteria could be used to evaluate the effect. Versions of Ishikawa diagrams were proposed in the cases of chemical engraving process, cast iron milling process, 3D printing process and the reliability of computer subsystems, respectively. A comparison of the Ishikawa diagram method with the systemic analysis method highlighted some particular aspects that could be considered when the problem of investigating the influence of certain process input factors on the process output parameters is formulated.

S2 - 5. The influence of additive manufacturing parameters on the structural and mechanical properties of acrylonitrile butadiene styrene (ABS) parts produced by fused filament fabrication

Daniel Cristea, Mihai Alin Pop, Costin Faraian and Daniel Munteanu

Transilvania University of Braşov, Materials Science Department, Braşov, Romania

Abstract. The key to the operation of additive manufacturing is that the parts are made by adding the material layer by layer. Each layer is a thin cross section of the part derived from the original CAD data. Each layer must have a finite thickness and thus the resulting part will be an approximation of the original data. The thinner each layer, the more the resulting piece will be more like the designed part. All additive manufacturing techniques marketed so far use a layered approach. However, certain drawbacks were reported for this type of manufacturing, all depending on certain process parameters. One of the most important build parameters, in terms of cost and final properties, is the build construction angle. The influence of the build positioning (i.e. angle of the layers) in respect to the building plate, during fused filament fabrication of acrylonitrile butadiene styrene (ABS) parts was studied. The characteristics of interest were: the structural features of the manufactured part and the mechanical properties obtained after tensile, compression, and hardness tests, all as function of the build orientation, while keeping the remaining manufacturing parameters identical. It was observed that the build orientation has a significant influence on the properties.

S2 - 6. Aluminum based metastable alloys for additive manufacturing

Alexandra Niţoi, Daniel Cristea, Mihai Alin Pop, Tibor Bedo, Bela Varga and Daniel Munteanu

Transilvania University of Braşov, Materials Science Department, Braşov, Romania

Abstract. Additive manufacturing (AM) is a technology which has the potential to replace conventional casting methods. Its capacity to obtain complex shapes is the main advantage over other manufacturing techniques. Metastable structures in the form of supersaturated or amorphous/nano solid solutions could potentially help the manufacturing process, due to energy release during heating, caused by the phase transformations towards stable structures. Aluminum-based alloys are of interest due to their combined high specific strength to weight ratio, good ductility and superior corrosion resistance. The paper presents results concerning the development of Al-Si-Ni alloys in bulk and melt-spun ribbon forms. The thermal stability of the aluminum-based alloys was analyzed by Differential Scanning Calorimetry, while some of the mechanical properties were assessed by instrumented indentation. The fast-cooled alloys exhibit metastable structures, inferred from the exothermal peaks observed during heating. A hardening phenomenon was also observed in case of the melt-spun ribbons, compared to the bulk alloys.

S2 - 7. Assessing the influence of significative parameters used in 3D fused filament deposition

Cristian Pisarciuc

Transilvania University of Brașov, Engineering and Industrial Management Department, Brașov, Romania

Abstract. The present article presents an analysis of the several parameters used at Fused Filament Deposition-FFD 3D printing process. To evaluate these parameters, a laptop / tablet support has been chosen as a subject that presents different characteristics both from the point of view of mechanical demands, to which it is subject, as well as geometry. The reason for choosing such an object to be produced by additive technology is the fact that in its geometry are encountered most of the spatial surfaces that present difficulties to be obtained by this method. In this context, the article highlights the steps that are necessary to get 3D printed objects to meet the initial design requirements. For the assessment of the degree of influence, parameters were identified and then they were evaluated to find an optimal solution. In the conclusions are presented some useful values for practical applications of this type and some considerations about two types of 3D slicers.

S2 - 8. Experimental researches concerning the manufacture of multitool 3D printer, type DIY (do it yourself)

Diana-Irinel Băilă, Sergiu Tonoiu, Mihai Cătălin Ştefan and Iasmin Şapadin

University POLITEHNICA of Bucharest, Manufacturing Engineering Department, 313 Splaiul Independentei, Bucharest, Romania

Abstract. In the last decade, additive manufacturing has greatly developed and the manufacture of cheaper 3D hybrid (multitool) printers has increased. Hybrid 3D printers are equipped with interchangeable heads for manufacture and permit multiple types of processing such as 3D printing, CNC cutting, laser engraving or deposition of pasty materials. The objective of this paper was to manufacture a hybrid 3D printer prototype, type DIY (do it yourself) and was equipped with g-code software necessary for 3D printing process and for CNC cutting. The materials used for construction for this hybrid 3D printer are cheap and accessible and some of electronic components are reused and recovered from old equipment and the functional 3D hybrid printer obtained can be a model for sustainability of products.

S2 - 9. Lean business practice as support to QMS implementation in according to ISO 9001:2015

Mirko Djapic[1], Predrag Popovic[2] and Ljubomir Lukic[1]

[1]University of Kragujevac, Faculty of Mech. & Civil Engineering, Dositejava 19, Kraljevo, Serbia
[2]University of Belgrade, Institute VINCA, Mike Petrovica 12-14, Vinca, Serbia

Abstract. The contemporary market conditions impose increasingly strict requirements on organizations. Orientation towards product quality is one of the optimum strategies enabling survival and development in the ever more globalized market. The business practice required by ISO 9001 standard is often insufficient for an organization to survive in the market. Therefore many organizations, in addition to developing and implementing Quality Management System (QMS), optimize their operative processes by implementing the Lean tools. The paper provides a concept of interconnecting the ISO 9001:2015 standard requirements with the possible Lean tools deployment, which is to contribute to promoting effectiveness of the implemented QMS.

S2 - 10. Process planning solution for increasing the productivity and robustness of work schedules for batch production processes

Mădălin-Gabriel Catană, Manuela-Roxana Dijmărescu and Nicolae Tunsoiu

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Abstract. This paper analyses the issue of ensuring enhanced productivity and robustness to work schedules designed for multi-operational batch production processes, when a fixed, limited number of workstations can be used for production. The productivity of a batch production schedule for a specific quantity of items is measured by the length of its cycle time, while the robustness of the schedule is given by the size and distribution of operational slack times that are ensured during the production process run. It is mathematically demonstrated that a simple process planning solution may be the key for meeting the above mentioned objectives, if it is possible to be applied in practice in combination with the lot streaming strategy for the production flow.

S2 - 11. Indoor path planning and obstacle avoidance simulation

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Abstract. The paper is describing the work performed for choosing and designing a path planning and obstacle avoidance solution for a car-like vehicle moving in an indoor environment. The proposed algorithm first consists in providing the vehicle with a set of passing points generated by a Dijkstra path planning algorithm. The vehicle is using the points for establishing its path and is avoiding the obstacles using scanned data from a distance sensor. In a simulation environment, initial tests were performed for estimating correct values of the vehicle's forward and angular velocities and for estimating the effect of the scanning speed on the vehicle's behaviour. Obstacle avoidance tests were performed for identifying specific situations possible to appear due to high velocities or to low scanning speed. Even not always choosing a smooth avoidance path, the algorithm proved to find a way for avoiding the obstacle in a clear and fast enough manner

S2 - 12. Development of key performance indicators modules for small and medium-sized enterprises in production industry

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Abstract. For small or medium-sized companies in the production industry, it is strongly advisable to intensify the use of key indicators in analysis and daily work, as well as open and honest communication throughout all levels of the organization as key factors for success. Although many enterprises now run customer relationship management systems to promote professionalization in the areas of customer satisfaction and customer service, key indicator systems are rarely used in a meaningful and optimal way. Massive potential for optimisation can be found in the whole system, so that a scientific survey study has been carried out in a number of companies from production industry. Based on the elements revealed by this study, a development of key performance indicators modules is proposed and synthetically described in the present paper. This development includes a series of key performance indicator – modules covering process and production management, sales management, customer and acquisition, human resources and innovation management, as an advanced structuring system in the field of key performance indicators.