



**Multidisciplinary Aspects
of Production Engineering**
MAPE 2023



19-22. SEPTEMBER 2023
GDAŃSK, POLAND

2023

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2023



**XX Międzynarodowa Konferencja
Multidisciplinary Aspects
of Production Engineering
MAPE 2023**

Conference Programme

**Polskie Towarzystwo Mechaniki Teoretycznej
i Stosowanej Oddział w Gliwicach**

Główny Organizator



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**XX Międzynarodowa Konferencja
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MAPE 2023**

CONFERENCE PROGRAMME



September 19, 2023

02:00 am – 05:45 pm	Arrival, Registration
06:00 pm – 07:00 pm	Welcome
07:00 pm	Gala Dinner

September 20, 2023

08:00 am – 09:15 am	Breakfast
09:30 am – 10:45 am	Plenary Session I
10:45 am – 11:15 am	Coffee break
11:15 am – 01:15 pm	Scientific Session II
01:30 pm – 02:15 pm	Lunch
02:30 pm – 04:30 pm	Scientific Session III
04:30 pm – 05:00 pm	Coffee break
05:00 pm – 06:45 pm	Scientific Session IV
07:00 pm – 11:00 pm	Grill

September 21, 2023

08:00 am – 09:15 am	Breakfast
09:30 am – 07:00 pm	Field trip to Gdańsk
07:15 pm	Dinner

September 22, 2023

08:00 am – 09:15 am	Breakfast
09:30 am – 11:00 am	Poster Session V, Summary
11:00 am	Departure from the hotel

PROGRAM SZCZEGÓŁOWY KONFERENCJI^{1,2}

20.09.2023

SESJA PLENARNA I, 09.30-10.45

1. John SCHERER

How Good Could You Be ?, Developing the Person inside the Position

2. Wes GREBSKI, Michalene Eva GREBSKI

Procedure for Faculty Assessment: Comparative Analysis (Poland and the United States)

**SESJA POD PATRONATEM
Sekcji Inżynierii Innowacji, Jakości
i Bezpieczeństwa Pracy KIP PAN**

20.09.2023

SESJA II, 11.15-13.00

1. Tadeáš SVĚTLÍK, Radek VARGA, Lukáš POSPÍŠIL, Martin ČERMÁK

Mortar Method for 2D Elastic Bounded Contact Problems

2. Kinga STECUŁA

Review of Virtual Reality Applications Applied in Industrial Practic

3. Inna BALAHUROVSKA

The Development of Technological Support Organizations as an Indicator of Management Efficiency

4. Mariya SIRA

Potential of Advanced Technologies for Environmental Management Systems

5. Leszek KAŻMIERCZAK-PIWKO, Piotr KUŁYK, Piotr DUBICKI, Adrianna DYBIKOWSKA

Sustainable Consumption Among Children in the Food Market

6. Marzena KUCZYŃSKA-CHAŁADA, Joanna FURMAN, Tomasz MAŁYA, Tomasz FIGA, Jozef PETRIK, Jolanta STASZEWSKA

Management Systems in the Automotive Industry – Assessment of Awareness of the Management Staff Regarding Their Implementation and Application

7. Jan KAŻMIERCZAK

About Managing Knowledge for and in Smart Cities

¹ SESJA 1 oraz 2 prowadzone są w j. angielskim/SESSIONS 1 and 2 are conducted in English

20.09.2023

SESJA III, 14.30-16.30

1. Barbara CIECIŃSKA, Beata OLEKSIK

The use of Quality Management Tools to Ensure Safe Working Conditions at CO₂ Laser Workstations

2. Szymon PAWLAK, Krzysztof NOWACKI

Analysis of the Impact of the 5S Tool and Standardization on the Duration of the Production Process – Case Study

3. Józef JONAK, Andrzej WÓJCIK, Robert KARPIŃSKI

Proces wyrywania zespołu kotew jako metoda odpajania brył skalnych

4. Małgorzata MALEC, Lilianna STAŃCZAK

Employees' Job Satisfaction and its Impact on Management Processes at the KOMAG Institute of Mining Technology

5. Tomasz MAŁYSA, Agnieszka FORMALCZYK, Marzena KUCZYŃSKA-CHAŁADA, Marek ŠOLC, Peter BLAŠKO

Safety of Machinery Regarding the Requirements of the Regulation 2023/1230/EU

6. Roksana POLOCZEK, Beata OLEKSIK

Management of a Simulation Project in a Manufacturing Company

7. Agnieszka PASZEWSKA, Anna LESSAER-KENTZER, Grażyna PŁAZA

Factors Supporting the Implementation of Eco-Innovative Solutions in Cities

8. Tomasz MAŁYSA, Joanna FURMAN, Marzena KUCZYŃSKA-CHAŁADA, Marcin TYRAŃSKI, Peter BLASKO

Survey of Employees' Awareness Regarding Occupational Health and Safety in the Automotive Industry

20.09.2023

SESJA IV, 17.00-18.45

1. Dariusz KRAWCZYK

Managing Social Communication. Analysis of Media Relations Activities of Polish Police Press Officers

2. Małgorzata GIELA

The Human Element in the Context of Smart Cities

3. Aleksandra KUZIOR, Vitalina BABENKO, Ihor REKUNENKO, Borys POHODENKO

The Current State of Scientific Research of the Process of Risk Management of Ukrainian Energy Sector Enterprises

4. Karolina ŁAKOMY

Impact of Workplace Lighting on Employee Safety

5. Marta NICIEJEWSKA, Monika KAPLER

Management of Occupational Health and Safety in Companies With a High Risk of Accidents

6. Beata OLEKSIK, Barbara CIECIŃSKA, Roksana POLOCZEK, Paweł WYRZGÓŁ

Quality Assessment of Zinc Coatings Applied by Selected Methods

7. Joanna FURMAN, Tomasz MAŁYSA, Marzena KUCZYŃSKA-CHAŁADA, Tomasz FIGA, Oksana VELGOSOVA

Assessment of the Management Awareness of the Use of LM Methods and Tools in the Automotive Industry

22.09.2023

SESJA V, POSTEROWA, 09.30-11.00

1. Paweł KOCOT, Dorota PALKA, Magdalena PALACZ

Production Process Simulation as an Element of Industry 4.0 Implementation in a Concrete Factory

2. Tibor KRENICKÝ, Jozef MAŠČENÍK, Tomáš CORANIČ, Juraj RUŽBARSKÝ

Operating Characteristics of Bearings With Magnetic Nanoparticles Doped Lubricant

3. Łukasz BOŁOZ

System wspomagania oceny stateczności przegubowych wozów wiercących

4. Magdalena MAZUR

Planning Quality Control in the implementation of 3D Printing Processes

5. Jakub CIEŚLA, Robert ULEWICZ

Transforming Semi-Trailer Construction with Modern Materials: A Quality-Driven Approach

6. Pavol BOŽEK, Elena PIVARČIOVÁ

Development of Control System of Mobile Robot With Differential Drive

7. Dorota KLIMECKA-TATAR

Development and Improvement of a Production Company (and Their Product) Based on the Value Stream Mapping of Business Processes

8. Vasyl MYKHAILIUK, Michał ZASADZIENÍ, Mikhailo LIAKH, Ruslan DEINEHA, Yurii MOSORA, Oleh FAFLEI

CFD Modeling of Gas Separator Operation

9. Anna MARYNIAK, Paweł KLIBER

Resilient Chains and Chain Shortening – Trade Exchange Perspective

10. Witold BIAŁY, Pavol BOŽEK, Łukasz BOŁOZ

Diagnostic Methods and Ways of Testing the Workability of Coal – a Review

11. Patrycja HĄBEK, Juan J. LAVIOS, Adam GRZYWA

Lean Manufacturing Practices Assessment. Case Study of Automotive Company

12. Juraj RUŽBARSKÝ, Tibor KRENICKÝ, Jozef MAŠČENÍK, Tomáš CORANIČ

Options for Solutions of the Inlet System Into the Mold

13. Łukasz BOŁOZ

Influence of the Drill Bit Tip Geometry on the Rotary Drilling Process Performed With a Hand-Held Hydraulic Drill

14. Aleksandra KUZIOR, Hanna YAROVENKO, Paulina BROŻEK, Natalia SIDELNYK, Anton BOYKO, Tetyana VASILYEVA

Company Cybersecurity System: Assessment, Risks and Expectations

15. Magdalena TUTAK, Jarosław BRODNY, Piotr MAŁKOWSKI

Applying Model Studies to Support the Monitoring of Methane Hazard During the Process of Underground Coal Mining

16. Andrii BUCHYNSKYI, Taras ROMANYSHYN, Myroslav BUCHYNSKYI, Lyubomyr ROMANYSHYN, Michał BEMBENEK

Ensuring Efficiency of Technical Operation of Equipment for Workover Operation

17. Tomáš CORANIČ, Juraj RUŽBARSKÝ, Tibor KRENICKÝ, Jozef MAŠČENÍK

Design of Self-leveling Table for FFF Additive Technology

18. Larysa MOSORA, Michał MOLENDĄ, Vitaliy TOLUBYAK, Sviatoslav KIS, Volodymyr OLENYUK

The Role of the State in the Formation of Migration Attractiveness – Example of Ukraine and Poland

19. Jozef MAŠČENÍK, Tomáš CORANIČ, Juraj RUŽBARSKÝ, Tibor KRENICKÝ

Monitoring of Belt Floating Under Controlled Belt Transmission Load

20. Piotr KUŁYK, Leszek KAŹMIERCZAK-PIWKO, Piotr DUBICKI, Adrianna DYBIKOWSKA

Sustainable Consumption Among Children in the Aspect of Waste Management

21. Bożena GAJDZIK, Erika SUJOVÁ, Witold BIAŁY

Decarbonisation of the Steel Industry: Theoretical and Practical Approaches with Analysis of the Situation in the Steel Sector in Poland

22. Dorota PALKĄ, Henryk BADURĄ

Forecast of the Maximum Methane Concentration in the Longwall Outlet and in the Ventilation Roadway. Case Study

23. Krzysztof KRAUZE, Kamil MUCHĄ, Tomasz WYDRO, Jan PAWLIK, Aleksandra WRÓBLEWSKA-PAWLIK

The Photogrammetric Approach in Conical Picks Wear Rate Evaluation

24. Arkadiusz BOCZKOWSKI

Analysis of the Change in Directionality of a Gunshot Noise After Applying a Gun Silencer

25. Jolanta IGNAC-NOWICKĄ

Improvement of Security Management in the Warehouse Space Through the Use of a Vision System in a Selected Enterprise

26. Tomasz MAŁYSA, Agnieszka FORMALCZYK, Marzena KUCZYŃSKĄ-CHAŁADĄ, Marek ŹOLC, Peter BLAŠKO

Safety of Machinery Regarding the Requirements of the Regulation 2023/1230/EU

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Innovative Packaging Materials Made of Heat-Shrinkable LDPE Film Produced from Recyclates

28. Katarzyna MIDOR

Internal Client in Improving the Planning Process in a Production Company – a Case Study

29. Aleksandra SULIK-GÓRECKĄ

The Model Concept of Transfer Pricing Policy in MNEs in Relation to Strategic Management

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Effect of Diets of Patients Using Dietary Guidance Services in South-Western Poland on Quality of Life

31. Dagmar DLOUHÁ, Lukáš POSPÍŠIL, Viktor DUBOVSKÝ

The Simple Network-Based Measuring System for Improving the Evaporation Estimation

² dopuszczalne są zmiany w programie Konferencji/changes in the Conference program are allowed

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The Photogrammetric Approach in Conical Picks Wear Rate Evaluation

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Volume 29 (2023)

Krzysztof Krauze, Kamil Mucha,
Tomasz Wydro, Jan Pawlik,
Aleksandra Wróblewska-Pawlik
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Abstract: The cutting tools in mining industry are especially prone to rapid wear, since most of the rocks exhibit aggressive abrasion attributes. A typical representative of fast wearing mining end-tools is a conical pick (also known as tangential-rotary cutter). In order to decrease the premature deterioration, the manufacturers and users tend to enhance the lifespan of the tool by wide range of approaches, namely heat treatment, chemical treatment, burnishing, hardfacing etc. In order to estimate the wear rate of a given pick one has to select appropriate procedure and method of evaluation. By this time, most commonly applied method is to estimate the wear rate basing on mass loss measurements of the tools being exploited with constant cutting parameters and fixed conditions. The Authors proposed also a new method of volumetric wear assessment, basing of three-dimensional photogrammetric scanning and compared the results with the outcome of traditional mass wear evaluation of the same sets of tools. Additionally, this paper contains recommendations regarding both approaches (volumetric and mass), especially focusing on the possibilities of the new method concerning measurements of the manufactured tool.

Keywords: mining, rock cutting, conical picks, mass wear, volumetric wear

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Lean Manufacturing Practices Assessment. Case Study of Automotive Company

Production Engineering Archives
Volume 29 (2023)

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Adam Grzywa
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Abstract: Lean Manufacturing (LM) practices have gained popularity as a means to achieve high-quality products while reducing costs and delivery times. However, the implementation of LM can be challenging, with a high failure rate. This paper aims to explore the perspectives of employees and managers on LM practices implemented in an automotive company. The research involved primary and secondary data analysis, combining observation, interviews, and a questionnaire survey. The survey assessed knowledge and skills, impact on quality improvement, motivation, supervisor support, control, and engagement in LM development. The results highlight the importance of management commitment and support in achieving successful LM implementation. Moreover, the study emphasises the positive impact of LM practices on employee motivation and the overall quality of processes and products. The PDCA cycle emerged as the most impactful tool, along with other recognised tools like Poka Yoke, Andon, Kaizen, Visual Management, and the 5S method. The findings contribute to understanding the implementation and effects of LM practices, providing insights for companies seeking improvement through Lean Manufacturing methodologies.

Keywords: Lean methods and tools, lean implementation, employees and managers viewpoint, automotive

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Analysis of the Impact of the 5S Tool and Standardization on the Duration of the Production Process – Case Study

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Abstract: Due to the high level of competition in the manufacturing industry, the creation of working conditions that allow for smooth implementation of production processes is one of the conditions determining the proper functioning of the company. All production processes are exposed to the threat of delays. One of the solutions to reduce or eliminate the negative impact on the production process is the implementation of a management system based on the Lean Manufacturing philosophy. The concept of Lean Manufacturing, which was initiated by Toyota, in theory allows to improve quality, reduce costs and increase the speed of response to numerous changes resulting from the dynamics of external and internal factors occurring in various types of processes. The implementation of Lean Manufacturing tools in many cases allows for the elimination or reduction of waste, which directly affects the increase in profits generated by the production company. One of the most important activities necessary to be carried out during the implementation of selected Lean Manufacturing tools is the continuous control of the parameters of the production process and their assessment in terms of improving selected areas. In this article, based on the analysis of data from the production plant, an analysis was carried out to present the impact of the implementation of selected Lean Manufacturing tools (5S and standardization) on the duration of the production process.

Keywords: Lean Manufacturing, 5S tool, Standardization

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Company Cybersecurity System: Assessment, Risks and Expectations

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Abstract: The consequences of Industry 4.0 have led to rapid automation and digitalization, which have had adverse side effects in the form of cybercrime, violating enterprises' security. Creating an effective cyber security system is urgent for many companies worldwide. Therefore, this study aims to develop a composite indicator of company cyber security to assess the need for progressing their cyber security system based on the growth rates of cyber threats and cyber risks. The modified Porter matrix method was used in the paper. The calculations are based on indicators for 2016-2022 characterizing the share of companies experiencing one, six or more successful cyberattacks, considering the likely and very likely success of cyberattacks on them in the next 12 months, security threat and concern indices, the share of companies with a growing security budget affected by ransomware and experiencing a short-age of skilled IT security personnel, the cost of stolen or compromised credentials. As a result, enterprises' needs increased significantly for 2020-2022, mainly due to their digital transformation and the cyber threats growth after the COVID-19 pandemic. A comparative analysis showed that the need for a reliable cybersecurity system is much more significant than the active development of modern technologies. Spending on IT and cyber security is also increasing, but not enough to meet the needs of cyber security development. The exception is 2022, when the balance between them is achieved, which indicates the readiness of enterprises to develop a cyber protection system to ensure the security of their activities.

Keywords: cybersecurity, cyber risk, cyber threat, Industry 4.0, Porter's method

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Influence of the Drill Bit Tip Geometry on the Rotary Drilling Process Performed With a Hand-Held Hydraulic Drill

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Abstract: In the mining and construction industries, hand drills are used to carry out many processes related to excavation and auxiliary works. Hand drilling is commonly applied for making small diameter holes, especially in hard-to-reach places. In the case of manual drilling, an important parameter is drilling resistance, especially torque. Drilling tools are subject to wear, which has a negative impact on the process of drilling, including resistance and efficiency. A blunt tool lowers the drilling speed and puts more strain on the operator. The article presents the results of laboratory tests of selected parameters of the drilling process carried out with a hydraulic rotary drill. The tests were performed with the use of new drill bits as well as drills characterized by a various degree of wear. The tests were carried out for popular, frequently applied rotary drilling tools, on a unique laboratory stand that enabled setting the feed force and measuring the torque, rotational speed, drilling path, drilling speed as well as the in and out pressure of the drill. A number of characteristics were determined as a function of time and depth of the drilled hole. It was found that tool blunting affects the drilling process in various ways, whereas the intensity of this influence is determined by the type of blunting. The test results can provide a basis for developing a criterion for replacing a drill bit with a new one.

Keywords: rotary drilling, hydraulic drill, hand-held drill laboratory tests, mining drill

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Applying Model Studies to Support the Monitoring of Methane Hazard During the Process of Underground Coal Mining

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Abstract: The process of underground mining is one of the most complex and hazardous activities. In order to maintain the continuity and efficiency of this process, it is necessary to take measures to reduce this hazard. The paper addresses this issue by presenting a developed methodology for using model studies and numerical simulations to support the process of monitoring methane hazards. Its basis is the developed model of the region of underground mining exploitation along with the ventilation phenomena occurring in it. To develop it, the ANSYS Fluent program was used, based on the finite volume method classified as computational fluid mechanics. The model reflects both the geometries and physical and chemical phenomena occurring in the studied area, as well as the auxiliary ventilation equipment used during operation. The research was conducted for two variants of methane emissions from goaf zones, the first of which concerned the actual state of the mining area, and the second of which concerned increased methane emissions from these goaf zones. The purpose of the study was to determine the distribution of methane concentrations in the most dangerous part of the studied area, which is the intersection of the longwall and the tailgate, as well as the distribution of ventilation air flow velocities affecting them. The studies for both variants made it possible to determine places particularly exposed to the occurrence of dangerous concentrations of methane in this region. The methodology developed represents a new approach to studying the impact of methane emissions from goaf zones into mine workings.

Keywords: underground mining operations, methane hazard, numerical simulations, model studies, CFD and Ansys Fluent

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Ensuring Efficiency of Technical Operation of Equipment for Workover Operation

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Abstract: The priority of resources in the management system of influence on the system of technical operation of machines was evaluated. The proposed systemological model of information support for making managerial decisions regarding the technical operation of machines. The given analogy between the factors of technical influence and the resources required for this is substantiated. These are: "action" – "human resource"; "means" – "material resource"; "environment" – "information resource". The priority of the information resource in ensuring the efficiency of the technical operation of the machines is determined by expert evaluation methods. The proposed systemological model consists of the structuring and systematization of information resources of dispatch reports and the procedure for performing further analytical procedures performed by information and analytical maintenance of enterprises with the help of software to obtain relevant information. Such continuous monitoring of equipment operation processes provides engineers with the necessary data for: the analysis and selection of an effective model of technical operation of the equipment; to develop alternative management decisions and make the optimal one; development of individual models and maintenance strategies with their adjustment and adaptation to real operating conditions. Also, this model provides professionals with a tool for comprehensive evaluation of the efficiency of the enterprise's production organization, the dynamics of its development, and the consequences of management decisions in different periods. It makes it possible to make informed decisions regarding the improvement of the management system and the subsequent formation of an effective strategy for the technical operation of machines.

Keywords: maintenance, management of machine operation, mtechnical operation workover rig, workover operation

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The Simple Network-Based Measuring System for Improving the Evaporation Estimation

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Abstract: This paper presents a novel method for measuring the data for evaporation estimation as the key ingredient for the final decision of the reclamation form in the area of the Most Basin. The area has been intensively mined for many decades, resulting in significant landscape devastation, loss of natural habitats, and negative environmental impact. Currently, it is assumed that by 2050, three large-scale reclamation projects will be implemented in the area and it is necessary to decide which form of reclamation to choose. Whether to build lakes according to the currently valid rehabilitation and reclamation plan or to leave the area of the quarries in succession with the support of spontaneous inflow of water up to a naturally sustainable water level. Whether the first or second option is approved, or a combination of both, the prediction of evaporation from the free water surface will always be of great importance. To deal with this goal, the available meteorological data must be combined with a suitable calculation method. In our work, we suggest utilizing a measuring network of meteorological devices that describe the character of the weather in a given area of interest in a long-term time series. Together with the state-of-the-art calibration of models for calculating evaporation, the measurement network helps to provide more accurate evaporation data for a given area. Based on the analysis of research results, it will be possible to choose a specific right decision and thus contribute to the long-term sustainability of these reclamations.

Keywords: evaporation, hydric recultivation, calibration, measuring network, regression

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The use of Quality Management Tools to Ensure Safe Working Conditions at CO₂ Laser Workstations

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Abstract: The dynamic development of a variety of technologies replacing the existing difficult or variously arduous ones is the reason for the creation of new workstations. The paper describes the problems of work organization and identification of onerous and harmful factors at the workstations of laser cut-ting, marking and engraving of materials. It is proposed to use tools known from quality management to develop a plan for adapting new workstations to the requirements defined by the general principles of safe and hygienic work. The brainstorming technique, Ishikawa diagram and affinity diagram were used in the context of the studied workplaces. Direct and indirect hazards in laser processing of polymers were pointed out. A poka-yoke solution was also proposed to eliminate typical worker negligence. The effectiveness of the diagrams used in safety management was demonstrated, especially under conditions of lack of or incomplete information about the nature of the performed work. The results of the presented analysis can be used in any case of newly created laser workstations to identify complex problems of work organization.

Keywords: CO₂ laser, Ishikawa diagram, brainstorming, affinity diagram, poka-yoke

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Diagnostic Methods and Ways of Testing the Workability of Coal – a Review

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Abstract: The need to classify rocks in terms of workability stems primarily from the need to choose the appropriate, most effective diagnostic method (DM) and way of mining the given rock. Studying and measuring the workability of rocks is extremely difficult due to the fact that workability depends on many various factors. There are many DM for determining the workability of rocks, but none of them take into account the influence of all factors, hence the obtained results are only indicative. In the article, many DM and ways of determining the cutting resistance with the use of various devices are presented and characterized. The principles of their operations are presented, as well as the DM of measuring the cutting resistance and its utilitarian usefulness in forecasting the selection of mining machines on the basis of cutting for specific mining and geological conditions. The core of the problem is confirmed by the number of covered DM and tools in various research centers around the world. In the article, new tools measuring and evaluating the mechanical properties of the coal solid, all created in Poland, are presented. Their structure, principles of their operation, as well as the innovation of these solutions, are all presented. In this article, their advantages and disadvantages are highlighted, as well as showing the DM which best represents the way of work of the winning machine. Therefore, the results achieved through the aforementioned DM can be understood as representative values.

Keywords: workability, mechanical properties, of rocks, tool, components of forces, experimental research, measurement

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Effect of Diets of Patients Using Dietary Guidance Services in South-Western Poland on Quality of Life

Scientific Papers of Silesian University of Technology
– Organization & Management (2023)

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Purpose: The present paper aims to approximate issues related to the quality of life, which is directly affected by health status and nutrition.

Design/methodology/approach: Over the last years, there has been a noticeable trend towards healthy diets and physical activity. This is crucial for modern civilization with all its inherent lifestyle disorders and chronic diseases. These issues are correlative as demonstrated by the authors based on the empirical study and literature review of the presented problems. An empirical study referring to the problems discussed was conducted on a group of over one hundred respondents (patients of dietetic clinics).

Findings: (mandatory) What was found in the course of the work? This will refer to analysis, discussion, or results.

Research limitations/implications: The results directly indicated that people who eat healthy diets, as verified by the regularity and type of products consumed, rate their quality of life relatively higher than those who do not pay attention to their nutrition.

Originality/value: The paper also refers to issues related to health and its impact on the perceived quality of life, which are correlated. An important point to emphasise is that the article points to issues that are a reflection of everyone's life, and learning about the relationships presented can contribute to greater awareness and a relatively higher quality of life.

Keywords: quality of life, healthy lifestyle, diet, health status

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Employees' job Satisfaction and its Impact on Management Processes at the KOMAG Institute of Mining Technology

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– Organization & Management (2023)

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Purpose: The article contains an analysis of inquiry results concerning the KOMAG employees' job satisfaction and its impact on management processes. As in recent years a management style and paradigm were mainly oriented onto improving the employees' motivation and commitment, it is important to highlight the significance of job satisfaction. Satisfied employees go beyond their formal duties, required by job description, and they are ready to put in an extra effort to achieve organizational goals. Based on available literature and on the results of conducted inquiry, the Authors concentrated their research work on human resources management in the aspect of motivation, leadership and organizational culture as well as their impact on job satisfaction and employees performance. The paper is ended with conclusions which can be treated as a form of guidelines for managers responsible for investments in building values and a maintenance of all the efficient activities oriented onto management processes of human resources.

Design/methodology/approach: The main objective of the undertaken research work includes a presentation of the KOMAG employees' job satisfaction survey, enabling to improve human resources management processes. A realization of research-and-cognitive objectives enabled to obtain knowledge concerning an important aspect of management activities. The main methods used for the research are as follows:

- an analysis of publications,
- a case-study method,
- a heuristic method,
- a method of diagnostic investigation (questionnaires).

The subject scope of the paper embraces human resources management, in particular in the aspect of employees' job satisfaction.

Findings: The findings show an urgent need of introducing management measures oriented onto an improvement of the KOMAG employees' level of job satisfaction, in particular in the area of appreciation needs. An introduction of the holocation system should be taken into consideration as it rejects a traditional model of a company and makes self-organizing collective bodies active and creative. It is worth highlighting that an encouragement of employees to undertake activities of innovative character and an appreciation of their achievements are equally important as risk assessment and budget management in projects.

Originality/value: An approach to the management process of human resources seems to be new due to highlighting the job satisfaction aspect. Some recommendation and guidelines, based on survey results, are also a sort of novelty as they emphasize the aspect of appreciation needs. A suggestion of implementing holocation processes at the KOMAG Institute of Mining Technology confirms this new approach to managing human resources in an efficient manner.

Keywords: job satisfaction, management processes, motivation, institute, human resources, carrer paths, career perspectives

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Improvement of Security Management in the Warehouse Space Through the Use of a Vision System in a Selected Enterprise

Scientific Papers of Silesian University of Technology
– Organization & Management (2023)

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Purpose: The purpose of the presented research and analysis was to create design assumptions for a vision system supporting security supervision in the warehouse space to reduce threats.

Design/methodology/approach: In the first phase of creating the project concept, two methods of hazard analysis (FTA and ETA) were used in the warehouse facility. Then, at the stage of selecting the devices included in the video surveillance system, a simple FOKUS program was used to scale the cameras.

Findings: In order to create a vision system project for a selected warehouse facility, an analysis of its spatial structure, weak points and identification of possible threats was carried out, taking into account the specificity of work performed within the working space of the warehouse. Then, video surveillance zones were determined based on the classification of threats in the space of the facility. The devices included in the vision system were also selected according to the assumed functions of this system and their distribution in the tested object. In addition, the optimal parameters of the cameras (using a scaling program) and the characteristics of other necessary devices of the vision system were determined.

Practical implications: The solution can be an aid in making an investment decision by the management in order to improve security management in the examined warehouse facility of company X.

Originality/value: As a result of the analyses, an optimal and original design solution for the vision system was obtained for the tested warehouse in company X.

Keywords: security management, storage facility security, threat monitoring, video surveillance system

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The Role of the State in the Formation of Migration Attractiveness – Example of Ukraine and Poland

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Purpose: The purpose of the article was to describe migration issues based on the example of current Polish-Ukrainian migration processes.

Design/methodology/approach: When writing a scientific article, methods of analysis and synthesis of scientific literature were used; descriptive method of the main indicators that affect the migratory attractiveness of the state; method of generalization when forming general conclusions based on research results.

Findings: In particular, on the basis of the method of analysis and the system of scientific literature, it was determined that the issue of attractiveness of states is discussed by scientists especially in terms of its individual types: investment; economic; tourist; migration. Studying migration processes, some scientists analyze the peculiarities of migration processes, identify the most popular types of migration that are characteristic of one or another country, while others focus more on the positive and negative consequences of migration.

Originality/value: The article describes the current situation of Polish-Ukrainian migration, its scale, types, and causes. The problem of migration is presented in the context of the needs and interests of the countries in question.

Keywords: migration, migration attractiveness, socio-demographic indicators, population migration

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Safety Culture in Global Research: a Systematic Literature Review

Scientific Papers of Silesian University of Technology
– Organization & Management (2023)

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Purpose: The article presents the results of research related to the development of safety culture (SC) around the world. In particular, attention was focused on the search for trends that set the direction of SC development. Research gaps were identified as the basis for addressing new cognitive challenges, particularly in the area of SC modeling in manufacturing companies, to improve workplace health and worker productivity.

Design/methodology/approach: A systematic literature review (SLR) of a total of 22,199 scientific articles on SC culture available in three databases was adopted as the research method: Elsevier Science Direct, Springer Link, and Wiley Online Library, published between 2013 and 2023 based on defined keywords.

Originality/value: A new research task has been formulated, the implementation of which would be an important addition to the existing body of work on the formation of safe working conditions based on a human-centered approach.

Keywords: safety culture, Systematic Review, safety culture implementation, safety culture model

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Social Assessment of Usefulness of CMMS Class System for Industry 4.0 Enterprise

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– Organization & Management (2023)

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Purpose: The purpose of the article is recognition of the possibility of using CMMS class systems in supporting maintenance in the conditions of the implementation of the Industry 4.0 concept.

Design/methodology/approach: The above-mentioned purpose was achieved by examining the opinions of employees of the selected company based on a developed questionnaire including a set of questions about the above-mentioned possibilities. In the next step, a score of 1-5 was assigned to each question, where each score indicates the degree of achievement of these possibilities through the implementation of a CMMS class system in the enterprise. Finally, for each question and rating association, the probability of its occurrence was calculated (based on questionnaire data). On the basis of this probability, the value of the social assessment of the usefulness of the systems under consideration in the conditions of the implementation of the Industry 4.0 concept was calculated for each question. The results of the research were used to develop the conclusions contained in the article.

Findings: During the conducted research, it was found that there is a need to use CMMS class systems as a tool in the area of maintenance in an Industry 4.0 enterprise. However, it is necessary to continue research in this area, taking into account the specificity of individual industries and adapting solutions to specific requirements.

Research limitations/implications: The article shows the method of social evaluation of a technical solution which is a CMMS class system. Such a system may be implemented if the results of such an assessment are verified on the basis of data on maintenance activities of a technical, economic, organizational or environmental nature. Therefore, it is justified to continue research in the mentioned area using indicators and measures of the maintenance effectiveness (KPI, OEE, measures/indicators of reliability of machines, devices and systems), as well as methods and techniques of their simulation and forecasting in the discussed area.

Practical implications: The indicator for social evaluation can be used at the stage of selection, purchase of a CMMS class system of a production or service company or when carrying out comprehensive or partial changes in its information structure, ending with the implementation of a selected system of this class.

Social implications: Conducting a research using the method proposed in the article among the company's employees may convince them that the introduced changes are justified and beneficial for themselves, the company and its environment.

Originality/value: The article has a cognitive and application value, because it proposes the use of the original set of questions contained in the survey, as well as the original evaluation indicator of the CMMS class system.

Keywords: exploitation, maintenance, management, CMMS, Industry 4.0

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Resilient Chains and Chain Shortening – Trade Exchange Perspective

Scientific Papers of Silesian University of Technology
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Purpose: One of the fundamental ways to strengthen supply chains is by shortening them. This can be reflected in the degree of utilization of chains for exports and imports. This is crucial for efficient supply chain management as it enables simpler and faster logistics operations. However, on the other hand, comparative advantages, resource localization, and cost considerations may lead management decisions to refrain from significant supply chain shortening on a larger scale. Additionally, the increasing level of digitalization in the logistics industry, which supports supply chains, also contributes to this perspective.

The purpose of this study is, therefore to examine the extent to which recent crisis situations have influenced the exchange of exports and imports, categorized by short, medium, and long supply chains. The Polish economy has been chosen as a reference for this analysis. .

Design/methodology/approach: Statistical methods based on time-series analysis were employed in this research.

Findings: Despite the crises, supply chains have not been shortened. It can be observed that in the long term, as well as in the post-pandemic period, there has been a shift in the structure of supply chain towards longer chains, particularly noticeable in import dynamics. The reason why supply chain shortening for the purpose of enhancing resilience is not evident in the data, despite many declarative statements about this approach in empirical research, has been indicated.

Research limitations/implications: The formulated arguments in favor of supply chain lengthening should be confirmed through research in various economies.

Practical implications: The importance of this article lies in providing management decision-making suggestions, particularly regarding supply sources.

Social implications: The establishment of shorter supply chains is crucial for environmental sustainability and meeting customer needs.

Originality/value: Research in this field is often conducted in an aggregated form, without differentiating between various supply chain lengths. In this article, we have taken these factors into account.

Keywords: supply chain management, international trade, pandemic, reshoring, resilience

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Sustainable Consumption Among Children in the Food Market

Scientific Papers of Silesian University of Technology
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Purpose: The aim of the study was to identify consumption patterns among children. It was also crucial to determine the conditions influencing the behaviour of young consumers in the market.

Design/methodology/approach: The paper uses a critical analysis of the literature and survey research based on a prepared questionnaire. The survey was conducted among 1326 children in age groups from 9 to 15 years old. The questionnaire consisted of two parts, i.e. the substantive part and the respondents' particulars. The first part of the questionnaire contained a set of questions concerning e.g. children's ability to identify products with better environmental parameters, behaviours related to nutrition, saving, shopping, spending free time, waste management and implementing pro-ecological solutions in their households.

Findings: The research showed a relatively good knowledge of the basic principles of sustainable consumption and labelling of organic products among children. This picture is somewhat simplified. The results of the study also showed that for many children healthy eating still means only eating fruit and vegetables (leaving aside the issues of regularity and portions of meals, drinking the right amount of water or maintaining a balanced diet).

Practical implications: Modification of curricula in primary school to a greater extent emphasizing content related to the principles of sustainable consumption. It is important to increase the amount of information provided on the principles of proper nutrition. This knowledge should be comprehensive and coherent, and not only refer to individual aspects of a healthy lifestyle. It is necessary to involve whole families in such activities through workshops, meetings and other events, because as shown by this research, but also the professional literature, attitudes and skills in children are transmitted and consolidated in this way.

Social implications: Shaping sustainable consumption patterns among children.

Originality/value: The article provides up-to-date knowledge on consumption patterns in the area of food products functioning among children. This is particularly important in the context of the need to build sustainable consumption patterns among the surveyed group of market participants.

Keywords: sustainable consumption, food products, a child as a consumer, food market, ecolabelling

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Sustainable Consumption Among Children in the Aspect of Waste Management

Scientific Papers of Silesian University of Technology
– Organization & Management (2023)

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Purpose: The aim of the study was to identify consumption patterns among children. The article analyses the concept of sustainable consumption, focusing on children's consumption behaviour patterns in the field of sustainable waste management.

Design/methodology/approach: The paper uses a critical analysis of the literature and survey research based on a prepared questionnaire. The survey was conducted among 1326 children in age groups from 9 to 15 years old. The questionnaire consisted of two parts, i.e. the substantive part and the respondents' particulars. The first part of the questionnaire contained a set of questions concerning e.g. children's ability to identify products with better environmental parameters, behaviours related to nutrition, saving, shopping, spending free time, waste management and implementing pro-ecological solutions in their households.

Findings: The survey conducted among young consumers primarily pointed to the shortcomings of knowledge on waste segregation. Despite the fact that the vast majority declare that waste is collected selectively in their homes, they are unable to correctly indicate what type of waste should be thrown into the appropriate bins. Therefore, it is recommended that in each school, both primary and secondary, there are containers for selective waste collection, along with a description and instructions on what kind of waste should be placed in them. Undoubtedly, this will increase the ecological awareness of children and teach pro-ecological behaviour.

Practical implications: Modification of primary school curricula to a greater extent emphasizing content related to the principles of sustainable consumption in the area of rational waste management.

Social implications: Shaping sustainable consumption patterns among children by building awareness of appropriate behavior in the field of post-consumer waste management.

Originality/value: The article presents the current state of knowledge on consumption patterns among children in the area of waste management. This is a particularly important issue in the context of shaping sustainable consumption patterns among the surveyed group of market participants.

Keywords: sustainable consumption, food products, a child as a consumer, food market, ecolabelling

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Management of a Simulation Project in a Manufacturing Company

Scientific Papers of Silesian University of Technology
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Purpose: The main goal of managing a simulation project in a manufacturing company regarding the optimization of warehouse preparation and placement of galvanized steel profiles using FlexSim software is to improve logistics processes in the warehouse and increase production efficiency. In addition, the project aims to develop an effective package addressing scheme and introduce a special code, which will enable accurate management of profile storage and will improve the process of completing customer orders.

Design/methodology/approach: The simulation project management methodology is based on several key steps: defining goals and requirements, collecting data and modeling, designing scenarios, performing simulations, and designing an individual addressing scheme for parcels in the warehouse.

Findings: Simulations allow you to find the optimal warehouse layout that ensures effective use of the available space. This, in turn, allows you to increase the storage capacity and better organize the storage of profiles, which translates into minimizing losses and costs. Simulations allow you to test different strategies for placing profiles in a warehouse to minimize the time and effort needed to find them. Optimizing the placement process allows parcels to be located faster and more precisely, which speeds up order picking.

Research limitations/implications: Simulation-based process optimization requires model accuracy and reliability. Imprecise or inaccurate data can affect simulation results and lead to inappropriate decisions. This requires careful data collection and model validation before implementation. Further research may focus on optimizing routes inside the warehouse and optimizing internal logistics. Investigating the best routes and methods of transport will minimize the time your products pass through your warehouse. Research can introduce an element of random events, such as machine breakdowns or fluctuating demand, into the simulation model to better reflect real conditions and increase the reliability of the results.

Practical implications: The improvement of warehouse processes and the introduction of a special parcel addressing code can significantly reduce the risk of errors and material losses, which contributes to greater accuracy and efficiency in operation. customer satisfaction and improving customer relations.

Social implications: Effective optimization of warehouse and production processes contributes to increased work efficiency. Reduction of redundant activities, more precise management of resources, and more efficient order picking can affect employee satisfaction as well as positively affect working conditions and security.

Originality/value: The key element of originality is using advanced FlexSim software for modeling and simulation of storage processes and producing galvanized steel profiles. Simulations of this type integrated with real data and the implementation of a special package addressing code constitute a comprehensive approach to optimizing the entire process. The results of such a study can have a significant impact on the practice in manufacturing companies, enabling more effective warehouse management, shortening the time of picking orders, reducing costs, optimal use of resources, and improving the quality of customer service. It is an interdisciplinary approach that combines aspects of production management, logistics, process optimization, and the use of advanced IT tools.

Keywords: Simulation project management, process simulation, FlexSim software

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Quality Assessment of Zinc Coatings Applied by Selected Methods

Scientific Papers of Silesian University of Technology
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Purpose: This article presents the problem of corrosion phenomena occurring on steel products, which contributes significantly to the shortening of safe service life. One method of corrosion protection is the application of metal coatings. The most commonly used zinc coatings are described, along with two methods of their application: the galvanizing bath method and the lamellar method.

Design/methodology/approach: Coatings were made on the S195 steel specimens in different process variations. Weight, hardness and thickness, as well as surface defects, were used as criteria for assessing the quality of the coatings

Findings: It was found that the process in the galvanizing bath can produce untight coatings with defects. On the other hand, the coatings applied by the lamellar method, were characterized by better aesthetics, lower weight and thickness compared to galvanic coatings, higher hardness compared to galvanic coatings, and uniformly covered the material without discontinuities in the structure that could impair durability.

Originality/value: The research clearly indicated the directions of application of the analyzed galvanic and lamellar coatings. The application of coatings is justified in the use of products exposed to corrosive agents. In terms of decorative qualities, more favourable results were obtained on the specimens with lamellar coatings, as these coatings had a silvery colour and an aesthetically pleasing sheen compared to the galvanic coatings. Due to the characteristics of the coatings, galvanic coatings can be used on parts that are operated in harsh environments, while lamellar coatings can be recommended for products that are required to have a low weight change and certain aesthetics.

Keywords: galvanizing, galvanic coatings, lamellar coatings, coatings quality

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Management Systems in the Automotive Industry – Assessment of Awareness of the Management Staff Regarding Their Implementation and Application

Scientific Papers of Silesian University of Technology
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Purpose: The purpose of the publication was to present the results of surveys regarding the assessment of awareness of middle-level employees in the field of their implementation and use in a company from the automotive industry.

Methodology: Assessment of the management staff's awareness of the implementation and use of management systems in the automotive industry using a survey.

Findings: Conducting the study in the form of a questionnaire survey made it possible to: assess the management staff's awareness of the implementation and use of management systems in the automotive industry in a selected production company.

Research implications: Further research should focus on an in-depth analysis of the management's awareness and involvement in the implementation and use of management systems in the automotive industry and taking actions in line with the company's strategy.

Practical implications: The conducted research may provide important information for the management staff in terms of improving competences within the applied management systems.

Originality: The article concerns a very important aspect related to raising awareness in the field of applied management systems in the automotive industry.

Keywords: automotive management system, Lean Manufacturing, WCM, EFQM, Toyota Production System, PN EN ISO 9001, PN EN ISO 14001, PN ISO 45001, ISO/IEC 27001, ISO 28001, IATF 16949

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Assessment of the Management Awareness of the Use of LM Methods and Tools in the Automotive Industry

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Purpose: The article presents the results of a survey on the use of methods and tools of the Lean Manufacturing (LM) concept by middle management in an automotive industry company. The conducted study will allow to assess the management's awareness in this area. Knowledge of LM solutions, using them in everyday work, commitment, and support for employees are important factors in shaping the culture of continuous improvement. The middle management, who manages the work in individual departments of the company, through appropriate attitudes and behavior builds the awareness of the entire team.

Design/methodology/approach: The survey method was used to assess the awareness of middle management.

Findings: The conducted research made it possible to assess the awareness of the middle management regarding the use of LM solutions in the enterprise. The assessment of awareness was a subjective assessment resulting from the analysis of each survey question. Based on the conducted research, it was found that the vast majority of middle management has knowledge and high awareness in the field of continuous improvement, in the form of using the methods and tools of the LM concept in everyday work. Employees are aware of the impact of these solutions on various areas of activity (quality, safety, organization of production), engage in improvement projects, and identify and solve problems, but also see the difficulties associated with the implementation of LM methods and tools. The knowledge and awareness of middle management translate into the attitudes and behavior of employees, which affects the culture of continuous improvement of the company. Based on the research results, areas requiring improvement were also identified.

Research limitations/implications: The conducted survey research was limited to assessing the awareness of a specific group of respondents, i.e. middle management. The direction of further research should focus on assessing the awareness of production employees to obtain more complete information related to shaping the Lean culture in this company.

Practical implications: The conducted research may provide important information for the management staff on the awareness of middle management in the application of solutions of the LM concept. The research results also allow to identify areas requiring improvement actions.

Social implications: The article discusses issues related to the awareness and involvement of employees that shape the culture of continuous improvement in organizations.

Originality/value: The article refers to the study of the awareness of middle management in the use of methods and tools of the LM concept in the automotive industry in Poland.

Keywords: Lean Manufacturing, continuous improvement, management awareness, Toyota culture, Lean culture

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Survey of Employees' Awareness Regarding Occupational Health and Safety in the Automotive Industry

Scientific Papers of Silesian University of Technology
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Purpose: The aim of the research was to assess the awareness of middle-level employees in the field of health and safety at work and the rules related to work safety in the plant being the subject of the analysis.

Design/methodology/approach: In the scope of own research, a questionnaire was developed as a research tool that allowed to assess the awareness of persons managing employees in the field of health and safety in the automotive industry.

Findings: On the basis of the conducted research, it was found that middle-level employees have knowledge of the methods and tools used to improve work safety, and also see their significant impact on improving safety at the positions they are directly responsible for.

Research limitation/implications: The conducted analyzes were limited to statistical data obtained as part of a survey addressed to a specific group of respondents-middle-level employees.

Practical implications: The research carried out may provide important information for the management staff in terms of assessing the awareness of middle-level employees in the field of health and safety at work. They also allow for the identification of areas requiring further improvement, aimed at achieving the goals set by the management and the health and safety department.

Social implications: The article raises the issue of awareness of middle-level employees in the field of occupational health and safety.

Originality/value: The article refers to the awareness of middle-level employees in the field of health and safety who have contact with employees over whom they have direct supervision.

Keywords: occupational health and safety (OSH), surveys, employee awareness, automotive industry

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Factors Supporting the Implementation of Eco-Innovative Solutions in Cities

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The aim of the conducted research was to present an interdisciplinary view on the issue of implementing eco-innovative solutions in developing cities towards sustainable management. At the beginning, barriers, determinants and factors of Eco innovation implementation in cities were identified by analyzing the existing legal regulation, supported instruments and tools at the European and Polish levels to find the solutions motivating local authorities to implement environmental solutions. Existing and future legal regulations are one of the most important factors determining the use of environmental solutions in various enterprises and local government units. In the period of intensive growth of Eco innovations, a phenomenon called greenwashing was developed. In short way greenwashing means “is not everything ecological is green”. It constitutes a significant risk in achieving the assumed environmental effects by the cities. Simultaneously, the relationship between sustainable-oriented innovations (SOI) and the way of shaping the future cities, focused around the concept of their development, is of great importance. By consciously designing city space, taking into account the regional potential, it is possible to create effective conditions conducive to the implementation of the Eco innovations. This thinking requires an assessment of the potential and flexibility of current planning tools and the development and implementation of new ones that will effectively meet the challenges of city management in the era of Eco innovation. The effect of this is to present an interdisciplinary view of the city with the indication of the role and potential of using eco-innovative technologies, as well as presenting the consequences of not implementing them. The background for the presented theoretical research is the essence of the commonality and transparency of the stakeholders’ goals in the process of implementing Eco innovative solutions.

Keywords: green taxonomy, ETV, sustainable development, eco-innovations, European Green Deal, Paris agreement, Resilient City, city management

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Safety of Machinery Regarding the Requirements of the Regulation 2023/1230/EU

Scientific Papers of Silesian University of Technology
– Organization & Management (2023)

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Purpose: The purpose of the study is to present the changes resulting from the publication of Regulation 2023/1230/EU in the field of essential requirements for machinery.

Design/methodology/approach: As part of the conducted analyses, the changes resulting from the publication of the new Machinery Regulation 2023/1230/EU were summarized and the manufacturers' obligations regarding the conformity assessment process were summarized, as well as the possibilities of supporting work in the field of essential requirements using computer software.

Findings: Based on the analyzes carried out, differences in the scope of legal acts were summarized. It was also found that the new regulation's requirements include an additional group of products that the Machinery Directive did not explicitly cover.

Research limitation/implications: The conducted analyzes were limited to EU law requirements specified in the Machinery Directive and the regulation.

Practical implications: The research carried out may provide important information for manufacturers and employers regarding the changes resulting from the publication of the Machinery Regulation 2023/1230/EU, also adapted to the evolving technological changes. The study also summarizes additional aspects resulting from, among others, taking into account: new definitions, the introduction of a new conformity assessment procedure, third-party participation in the conformity assessment process, and digital instructions.

Originality/value: The article refers to the changes resulting from the 2023/1230/EU machinery regulation.

Keywords: machinery safety, machinery regulation, machinery, legal requirements

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Impact of Workplace Lighting on Employee Safety

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Purpose: The aim of the topic is to present the breadth of the issue of lighting in the workplace. A topic often treated marginally by employers but having a positive and negative impact on the health and safety of employees.

Design/methodology/approach: The article is a review of the literature on the impact of lighting on the employee, applicable, basic legal requirements, and a review of selected available statistical data on night work and work in conditions of insufficient lighting.

Findings: During the preparation of the article, it was found that the impact of lighting on the employee and his safety depends largely on the employer, his knowledge and commitment. Legal regulations are not precise when it comes to ensuring proper lighting for employees. Most parameters related to lighting in the workplace can be adjusted, and thanks to this there is a chance for better comfort and safety at work.

Originality/value: The article is a kind of recommendation for the employer - it indicates the areas that should be paid attention to, e.g. take care of employees health.

Keywords: workplace lighting, ergonomics, safety, shift work

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Review of Virtual Reality Applications Applied in Industrial Practice

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Purpose: The paper aims to explore the utilization of virtual reality applications in industrial practice, particularly focusing on Polish industrial enterprises. It identifies the various areas of VR application in the industry, provides new insights into VR's practical usage, and shows successful real-world examples, thus contributing to scientific knowledge by highlighting the extensive practical potential of virtual reality in Poland's industrial sector.

Design/methodology/approach: The objectives of the paper are achieved through a review and analysis of virtual reality applications used in Polish industrial enterprises. It focuses on specific VR solutions adopted by these companies, characterizing their practical applications and positive outcomes.

Findings: In the course of the study, the author conducted an in-depth review and analysis of virtual reality applications used in Polish industrial enterprises. The research identified various areas of practical VR implementation within the industry, and through the examination of specific applications, highlighted the positive outcomes and benefits of these solutions.

Research limitations/implications: The study's findings contribute new insights into the practical use of virtual reality in industry and can be a basis for developing directions for future research in exploring and expanding the scope of VR applications within industrial enterprises.

Practical implications: The practical implications of the study are significant for both the industrial sector in Poland and the broader application of virtual reality technology. By reviewing and characterizing specific VR applications used by Polish industrial enterprises, the paper offers practical insights into the diverse areas where VR can be effectively utilized in industry. These findings provide valuable information for companies seeking to improve their operations, efficiency, and safety through the implementation of virtual reality solutions.

Originality/value: The research addresses a knowledge gap by providing detailed descriptions and characterizations of VR applications that have been developed for specific companies and are actively used in practice. This emphasis on real-world examples and positive outcomes adds practical relevance to the study's findings, making it a valuable resource for businesses, researchers, and professionals interested in using the potential of virtual reality to enhance various aspects of industrial operations.

Keywords: virtual reality, VR, VR training, VR simulation, industrial practice

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The Development of Technological Support Organizations as an Indicator of Management Efficiency

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Abstract: The article is devoted to analysing the need for managers to spend money on developing technological support for organizations to achieve strategic goals. The impact of technologies in various sectors of organizations' activity on the effectiveness of organizational systems is considered. The work examines the activity of Ukrainian profitable and non-profit organizations on the influence of the level of technologicalization of organizational processes on increasing the level of profit and the social effect of activity. The study considered the statistical data of the State Statistics Service of Ukraine for 2018, 2019, and 2021 according to the indicators Number of enterprises that have access to the internet and the number of employed who have access to the internet and Number of employed who have access to the internet. The given statistical data were quantitatively processed (summarized and compared). With the help of theoretical research methods (deduction and analysis) of the obtained results, it was found that the organization's technological development helps to increase the organization's profitability and the non-profit organization's social effect. The practical value of the article lies in the visual representation of the dependence between the necessity of spending on the technological development of managers of profitable and non-profit organizations and the effectiveness of these organizations.

Keywords: effective management, humanistic management, manager, technological support, technologies

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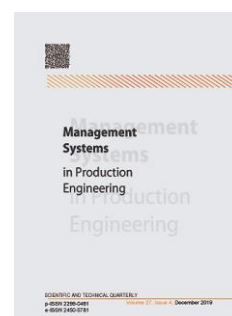
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Managing Social Communication. Analysis of Media Relations Activities of Polish Police Press Officers

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Abstract: The foundation of the social communication system of the Polish police is the press officers of district and city departments, who maintain regular contact with journalists of local and regional media, and incidentally also with national or international mass media. The aim of the 2022 survey was to determine the media relations activities, techniques and tools used by officers. All press officers in the police garrison in the Silesian Voivodeship participated in the research project. 100% of press officers took part in the survey. Responding to the expectations of journalists police officers prefer direct contact with journalists, including 52% by phone. Although press officers consider social media to be a good method of contacting the public (30%), they do not use it themselves in contacts with journalists. They prefer to use the official police website (28%). Police spokesmen, due to the information they have, gain the attention of the mass media and do not have to use modern communication techniques to attract journalists. Maintaining constant contact with journalists, press officers also assessed the level of their professionalism. According to the respondents, TV journalists are characterized by the highest professionalism (41%). In second place are press and radio journalists with a similar number of indications (27% and 24%). The professionalism of Internet editorial staff was rated the worst (8%).

Keywords: communication management, media relations, police public relations, press officers

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The Human Element in the Context of Smart Cities

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Abstract: The smart city concept, influenced by societal changes, technology, and geopolitics, is transitioning towards a human-centered model – Smart City 3.0. Emphasizing community engagement, this model ensures that new technologies are tailored to each city's unique needs. The creation of a participatory society is essential for this approach, fostering public involvement in decision-making. Core mechanisms include public consultations and participatory budgeting, as legislated, enhancing co-management between authorities and residents. To successfully implement Smart City 3.0, it is vital to build a partnership based on mutual trust between local authorities and communities. Opinions must not only be expressed, but factored into city planning and development. Advisory bodies like city youth councils illustrate this approach, engaging youth in meaningful roles and ensuring their interests are represented. This paper investigates the vital role of community members in the creating of smart city. Additionally, the paper conducts a comprehensive review of various models of participation, evaluating their respective strengths and weaknesses within the context of smart city development

Keywords: smart city, participation, public consultation, co-rule, human

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The Current State of Scientific Research of the Process of Risk Management of Ukrainian Energy Sector Enterprises

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Abstract: The research dedicated to risk management issues in the energy sector addresses current problems associated with risk management that arise in the energy sector. The aim of the study was to identify factors that affect risks, analyze scientific risk management methods, and consider innovative approaches to risk management in the energy sector. The study used a critical analysis of the literature on the subject as well as an analysis of risk management standards and methods. The innovation of the research lies in its consideration of modern trends in risk management in the energy sector, taking into account changing economic and political conditions, technical possibilities, as well as social attitudes and demands. The study showed that the most effective approach to risk management in the energy sector is the use of an integrated risk management system that takes into account all aspects of enterprise activity. The results of the study can be useful for energy companies that deal with risk management. They can be used to improve risk management strategies and reduce the possibility of negative consequences. In addition, this research can be used for educational purposes for students and professors who study risk management and the energy sector. The next steps of the research may include expanding the scope of the study to other areas and developing more detailed risk management models.

Keywords: risk management, energy sector, sustainable development, risk management methods, risk analysis

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Mortar Method for 2D Elastic Bounded Contact Problems

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Abstract: This paper presents a contribution to the field of numerical solutions for contact problems, which pose significant challenges in engineering and simulations. Specifically, we address the intricate task of connecting bodies that have been discretized using non-conforming and non-overlapping meshes. Our primary focus lies in investigating the efficacy of the mortar method with a segment-to-segment approach. In this context, we provide a concise overview of the underlying theoretical framework and present our implementation in the Matlab programming environment. To ascertain the reliability and accuracy of our proposed methodology, we conduct a rigorous validation study by comparing the outcomes obtained from our implementation with those derived from the widely adopted commercial software, Ansys. To enable a comprehensive evaluation, we select specific benchmark problems that involve the interaction of two elastic bodies. Through a meticulous analysis and comparison of results, we demonstrate the effectiveness and robustness of our approach. The findings of this study contribute substantively to the advancement of numerical techniques for solving contact problems. The validated methodology not only establishes a solid foundation for future research endeavors but also offers a reliable framework for conducting simulations in this domain. Furthermore, the insights gained from this study can potentially facilitate the development of more efficient and accurate computational algorithms for addressing contact problems encountered in various engineering applications.

Keywords: finite element method, mortar method, non-conforming meshes, elastic contacts

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CFD Modeling of Gas Separator Operation

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Abstract: Today, gas-liquid separators are usually used for the purification of gas mixtures from droplet liquid, and there are many designs of which. However, in order to improve the efficiency of their work, increase throughput, reduce mass and dimensions, they are constantly being improved. Usually, developing a new or improving an existing separator design is a long-term and relatively expensive process. Today, computer programs that implement the finite element method make it possible to speed up and reduce the cost of designing both a gas separator and other equipment. FloEFD program is one of these programs. However, it is more convenient during design to use one computer program that allows you to build 3D models (CAD) and in the same program to use a module for simulating the movement of gas and liquid flows (CFD). Such a program is SolidWorks with the FlowSimulation application module. As for the physical processes that occur during the operation of gas separators, they are quite complex, since a multiphase gas flow with an existing liquid phase is simulated. The main parameter that characterizes the degree of separation of liquid from gas in the separator is the efficiency factor, which depends on the design of the separator, thermobaric conditions, parameters of the technological scheme, composition and physical and chemical properties of the gas-liquid flow.

Keywords: gas-liquid separator, efficiency coefficient, FlowSimulation, simulated modeling

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Forecast of the Maximum Methane Concentration in the Longwall Outlet and in the Ventilation Roadway. Case Study

Management Systems in Production Engineering
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Abstract: The mining process of the coal seam wall is accompanied by the release of methane into the mine atmosphere. This process is highly variable and depends on the methane content in the seam and the methane saturation of the rocks surrounding the seam. This is the specificity of the Polish hard coal mining industry. In the article, prognostic formulas for the maximum methane concentration at the outlet of the longwall ventilation gallery were developed. In the presented article, these formulas were used to predict methane concentration at the longwall outlet and in the ventilation gallery at a distance of up to 10 m in front of the longwall. In order to assess the accuracy of the forecasts, their results were compared with the forecast at the exit of the ventilation roadway. The obtained results are so accurate that it is worth repeating this type of check also using measurements in other longwalls. It will allow to reduce the risk of methane explosion during operation.

Keywords: methane content, max methane concentration, methane content forecasts, methane content changes, analysis of measurement data and forecasts

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Analysis of the Change in Directionality of a Gunshot Noise After Applying a Gun Silencer

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Abstract: The impulsive noise generated during a gunshot constitutes a considerable threat not only to the health of shooters but also significantly affects the environment. Its particular nuisance and impact on the acoustic environment are typically observed in residential areas located in the immediate vicinity of military, sports, and hunting shooting ranges. One of the most effective ways to reduce gunshot noise is the use of silencers, which not only lower the overall energy of the acoustic wave emanating from the barrel, but also influence the directionality of the noise source and the frequency characteristics of the sound. Understanding the change in sound directionality after the application of silencers will allow for more precise modelling of noise propagation within the environment, for example, when designing new shooting ranges or achieving noise reduction existing ones. The article describes the author's research results on the effectiveness of gunshot noise reduction and changes in the directionality of the sound source after the application of selected silencer models for different gun calibers and types of ammunition. Based on the conducted research, the general trend of changes to directional characteristics is determined and the possibility of utilizing this knowledge in modeling of the acoustic effects of shooting ranges is presented.

Keywords: noise, gunshot noise, gun silencer, noise directionality, noise reduction, environmental protection

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Development and Improvement of a Production Company (and Their Product) Based on the Value Stream Mapping of Business Processes

Management Systems in Production Engineering
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Abstract: Value stream mapping is one of the basic tools used in the processes improvement or design – in accordance with the Lean concept. This paper presents a model of designing production processes and introducing new products to the market based on the analysis of the value streams flow in the production process. Particular attention was paid to the importance of input data necessary to plan a properly functioning production process, which results in a high-value product (from the customer's point of view). Particular attention was paid to the fact that in the processes of creating innovative engineering materials/products methods of advanced product quality planning (APQP – Advanced Product Quality Planning) are used, which are oriented on quality in the product development process and contribute to: creating value (based on customer requirements) while maintaining timely deliveries and constant costs (Value Stream Mapping), sustainable use of tangible and intangible resources (removing waste at the design stage). The paper presents a set of parameters required for the proper design of a new material/product based on the design of the production process of modern neodymium magnets with increased quality requirements.

Keywords: value stream mapping, VSM, APQP, product design

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Transforming Semi-Trailer Construction With Modern Materials: A Quality-Driven Approach

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Abstract: The automotive industry faces challenges in maintaining quality control while at the same time reducing costs and improving efficiency. Outsourcing has emerged as a potential solution. Such an approach can create issues such as communication barriers, quality control problems, and limited visibility into the manufacturing process. This study proposes a cloud-based quality reporting solution to overcome these challenges by providing real-time data analytics, facilitating proper communication, and enabling visibility into quality control processes. This solution significantly reduces waiting times for information regarding product quality status and allows interested parties to access data immediately. The outsourcing company, product producer and customer receive flexible, traceable, mobile cloud-based analytics in real-time. Challenges of this solution are the need to secure data, manage access and ensure the appropriate quality of data by persons performing control. The paper provides practical recommendations for implementing cloud-based quality reporting systems.

Keywords: semi-trailer construction, quality control, cloud-based analytics, quality data

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Management of Occupational Health and Safety in Companies With a High Risk of Accidents

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Abstract: Occupational health and safety management in enterprises with an increased risk of accidents is a process that requires commitment and knowledge from both employers and employees. Enterprises with an increased risk of accidents include primarily manufacturing enterprises, especially mining, processing and assembly enterprises. A serious accident at work costs an employer over PLN 1 million on average, and the risk of accidents may increase with the full return of employees to work. Taking care of safety is not only a matter of the health of employees and the ethics of the employer, but also a cost factor. Despite many changes in technique and technology, companies around the world still generate accidents, including fatal ones. Data from the National Labor Inspectorate and data from the European Agency for Safety and Health at Work (EU-OSHA) show that it is mainly the human factor that determines the size and severity of accidents at work in enterprises. Therefore, there is a great need for effective occupational health and safety management in enterprises, with particular emphasis on the human factor. This article presents surveys conducted in Polish enterprises with an increased risk of accidents. The authors of the article analyzed the causes of accidents in the surveyed enterprises, with particular emphasis on the soft skills of employers and employees. There is a belief that this is an area that should be addressed with particular care and reliability, as factors such as effective communication, organizational culture and safety culture have an impact on the number of accidents in enterprises.

Keywords: occupational health and safety management, work safety, safety management, OHS, accidents at work

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Planning Quality Control in the Implementation of 3D Printing Processes

Management Systems in Production Engineering
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Abstract: Industry manufactories spent more resources on optimizing the processes of faultless production, satisfying customers with a high new level of quality. Due to this new reality companies are making a focus on methodologies that will help to control production waste, cost, production time, etc. More rational application of both quality control, and scheduling is in need. The article presents analysis that concern a detailed assessment of the quality control of the tested process. The analysis used typical quality control tools that are commonly used in control processes. Qualitative analysis were performed using three basic tools: Pareto-Lorenz diagram (quantitative analysis), Ishikawa diagram (qualitative analysis for causes), and risk analysis (FMEA). The quality analysis presented in this article show the tasks of the quality control department in detecting production non-conformities and preparing for preventive actions in manufacturing processes. The authors present analysis both in the control process, but also at the planning stage of these processes. The defects in the 3D printing process can be physical or software-related, and their causes need to be analysed constantly. It also provides examples of defects that can occur during 3D printing, such as plastic overheating, web formation, and software setup errors. The importance of proper calibration of the 3D printing machine, choosing the right plastic and environmental conditions, such as temperature and moisture, for avoiding defects is mentioned. The moisture contained in the air can spoil plastic filaments, and the plastic needs to be dried before loading into the 3D printer.

Keywords: quality control tools, process quality supervision, risk analysis, 3D printing process, process planning

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System wspomagania oceny stateczności przegubowych wozów wiercących

Systemy Wspomagania w Inżynierii Produkcji
Volume 12 (2023)

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Streszczenie: Samojezdne maszyny górnicze takie jak kołowo- oponowe wozy wiercące charakteryzują się budową przegubową oraz wyposażone są w wysięgniki z organami roboczymi wysuniętymi daleko poza obrys podwozia. Taka konstrukcja powoduje, że maszyny te są podatne na utratę stateczności. Stąd też konieczne jest analizowanie rozkładu mas oraz ich szeroko pojętej stateczności podczas całego procesu projektowania, przy uwzględnieniu wielu czynników wynikających ze sposobu i warunków ich pracy. Jednak brak jest odpowiednich modeli obliczeniowych pozwalających na przeprowadzenie badań analitycznych dla maszyn o takiej konstrukcji. W artykule przedstawiono autorski system wspomagający szybką ocenę stateczności jedno i dwuwysięgnikowych wozów wiercących. Model pozwala na przeprowadzenie analiz bez konieczności rozwiązywania równań różniczkowych występujących w modelach dynamicznych oraz bez stosowania badań modelowych za pomocą narzędzi CAD/CAE. Opracowany model obliczeniowy został zweryfikowany przez porównanie uzyskanych wyników z wynikami z pełnego modelu dynamicznego, z wynikami badań modelowych przeprowadzonych w programie CAD/CAE oraz z wynikami badań empirycznych nacisków kół i podpór na podłożu dla wybranego wozu wiercącego. Na podstawie weryfikacji i walidacji tego modelu stwierdzono jego pełną poprawność oraz przydatność. Model został wykorzystany do opracowania praktycznego i łatwego w obsłudze arkusza obliczeniowego. Następnie przeprowadzono badania analityczne stateczności wybranego wozu wiercącego. Model obliczeniowy jak i arkusz kalkulacyjny stanowią podręczne narzędzie wykorzystywane podczas procesu projektowania przez jedną z polskich firm produkujących wozy wiercące.

Słowa kluczowe: stateczność wozów wiercących, dynamika wozów wiercących, badania modelowe, model dynamiczny, model fizyczny, model matematyczny, badania symulacyjne, narzędzia CAD/CAE

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Development of Control System of Mobile Robot With Differential Drive

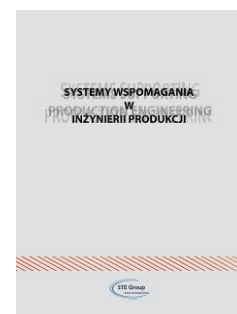
Systemy Wspomagania w Inżynierii Produkcji
Volume 12 (2023)

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Abstract: Currently, the topic of automation of logistic processes in warehouses is relevant. The article considers a control system of high level for a mobile robot with a differential drive with a maximum payload of 200 kg. with motion simulation in the Matlab Simulink software product. Optimal control of drives based on brushless DC motors at the lower level has been developed. The transient time of low level control system is 1.067 seconds. The mobile robot control system in the minimum version consists of ten ultrasonic distance sensors located along the perimeter of the mobile robot body and of eight contrast band sensors.

Keywords: mobile robot, automation, control system, simulation

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Options for Solutions of the Inlet System Into the Mold

Systemy Wspomagania w Inżynierii Produkcji
Volume 12 (2023)

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Abstract: The presented contribution points out the possibilities of solving the inlet system, as one of the important factors influencing the final quality of the castings. Due to its design and function, the sprue system influences the process of filling the mold cavity. With the correct design of the sprue system, we achieve the continuity of filling the mold cavity and the elimination of qualitative and quantitative errors caused by non-observance of basic principles in the design of sprue systems. When conducting the experiments, we monitored the mold inlet system, modeling the process of filling the mold cavity and the speed of the liquid metal in the notch and the mold cavity. The results of the experiments show that the speed of the liquid metal when filling the mold is approximately half of the calculated theoretical value.

Keywords: pressure casting, mold construction, inlet system, pressure

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Metody gromadzenia i analiz danych przestrzennych we wspomaganiu eksploatacji środków technicznych przez osoby starsze – przegląd literatury i możliwości zastosowania

Systemy Wspomagania w Inżynierii Produkcji
Volume 12 (2023)

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Streszczenie: Coraz większa liczba eksploatatorów (użytkowników i obsługujących) środków technicznych wymaga podjęcia działań ukierunkowanych na zapewnienie takim osobom odpowiedniej przestrzeni życiowej, w tym w miejscu pracy, która będzie przystosowana do ich potrzeb i w której środki te będą spełniać swoje zadania zgodnie z przeznaczeniem (użytkowanie). Celem, w następstwie którego działania te są podejmowane powinno być zapewnienie odpowiednich warunków funkcjonowania w omawianej przestrzeni. Dlatego też konieczne jest opracowanie metod i technik oceny jakości życia, które będą umożliwiły gromadzenie, przetwarzanie oraz analizę danych przestrzennych. Potrzeba ta skłoniła autora do dokonania przeglądu w literaturze rozwiązań modelowych w omawianym obszarze, uwzględniających aspekt przestrzeni, a także zaproponowania koncepcji zastosowania wyżej wymienionych metod w poprawie jakości życia osób starszych.

Słowa kluczowe: jakość życia, osoby starsze, zarządzanie, eksploatacja, obsługiwane, komputerowe wspomaganie

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Wpływ e-commerce na Przemysł 4.0

Systemy Wspomagania w Inżynierii Produkcji
Volume 12 (2023)

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Streszczenie: Artykuł koncentruje się na specyfice modeli biznesowych przedsiębiorstw Przemysłu 4.0 w kontekście konkurencji w e-commerce uwzględniając popularne modele sprzedaży internetowej, takie jak sklepy internetowe i marketplace. Komponent technologiczny e-commerce oraz nacisk na innowacyjność w Przemysle 4.0 stwarza ogromny potencjał biznesowy i rozwojowy, co implikuje znaczące korzyści w postaci m.in. zwiększenia efektywności produkcji, poprawy jakości obsługi klienta oraz wzrostu sprzedaży. Celem artykułu jest podkreślenie kluczowej roli danych jako łącznika oraz logistyki jako wspólnego elementu między branżą e-commerce a Przemysłem 4.0.

Słowa kluczowe: e-commerce, Przemysł 4.0, logistyka, marketplace

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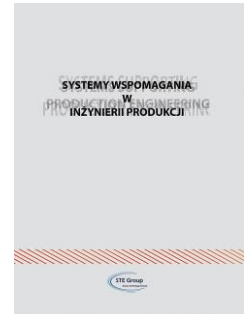
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Design of Self-leveling Table for FFF Additive Technology

Systemy Wspomagania w Inżynierii Produkcji
Volume 12 (2023)

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Abstract: The presented paper describes the conceptual design of a worktable intended mainly for use in combination with FFF additive technologies, calibrated using a gyroscope and accelerometer. The proposed system is based on a programmable Arduino platform that operates with three digital servomotors and a mechanical gyroscope. In the introduction, the theoretical assumptions, and definitions of basic concepts such as a gyroscope, electric motor, and RC servomotor are described. Subsequently, the contribution is devoted to the selection of suitable components, the schematic connection, and the design itself in the Autodesk Inventor program. In the conclusion, the anticipated benefits of using the technical solution when applied in FFF additive technologies are described.

Keywords: Additive Technologies, Calibration, Arduino, Structural Design

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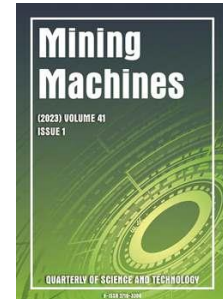
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Monitoring of Belt Floating Under Controlled Belt Transmission Load

Mining Machines
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Abstract: The submitted paper focuses on experimental monitoring of tightening and floating of the belt in case of controlled loading of belt gear. In general, the belt gear is referred to as friction gear in practice the primary function of which is to transfer the performance as a consequence of frictional forces occurring between a driven belt pulley, a driving belt pulley and a flexible element. In case of experimental measurements, the flexible element is represented by a V-belt. The main advantages of the belt gears are peripheral speed, flexible engagement, silent running, vibration absorption and their price. Standard operation of the belt gear requires correct belt tightening which is achieved by movement of a pulley and a tension roll. At the same time, the belt tightening can be assured by changing the spacing of the shaft axes which was used in experiments. In case of belt gears use specific principles must be observed. The principles include tightening of the belt by particular force which represents, in fact, primary condition of transmission of motion and force. In case of state of rest, the tension of both belt parts is identical [8]. Complex analysis of belt gears was followed by experimental measurements on the stands designed for testing and monitoring of belt gears. For the purposes of monitoring of the belt floating there was a system designed which uses a high precision sensor to measure distance between the belt and the sensor. At the same time, a device designed to determine the belt tightening was used as well. All measurements were analysed and collected data and facts were used to determine dependencies possible to be applied when the monitored parameters are evaluated. The results of experimental monitoring of the selected parameters in case of controlled loading of the belt gear can be useful in practice in case of its design, check and maintenance.

Keywords: Monitoring, belt floating, strength, belt gear, tension, load

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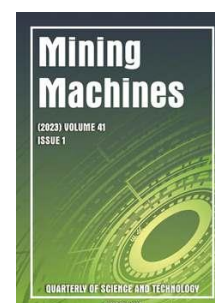
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Operating Characteristics of Bearings With Magnetic Nanoparticles Doped Lubricant

Mining Machines
Volume 41 (2023)

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Abstract: The main aim of the presented research was to investigate the operational characteristics of a bearing when alternative lubricants were used for comparison with a standard lubricant, including that containing magnetic nanoparticles. The bearing was subjected to varying operating conditions, differing in terms of mechanical load status. The monitoring of the bearing operation parameters primarily focused on monitoring the velocity and acceleration of vibrations, as well as the operating temperature of the bearing. The bearing with lubricant doped by magnetic nanoparticles exhibited reduced vibration velocity and acceleration values both under no load conditions and when subjected to a mechanical load. The operating temperature slightly increased during testing in the case of the bearing with nanoparticles compared to the bearing using the original lubricant.

Keywords: lubricant, magnetic nanoparticles, bearing, vibration

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Potential of Advanced Technologies for Environmental Management Systems

Conference, Multidisciplinary Aspects
of Production Engineering MAPE 2023

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Abstract: Environmental management systems (EMS) are essential in promoting sustainable practices and mitigating the adverse effects of human activities on the environment. As technology continues to advance, there is an increasing opportunity to utilize advanced technologies to improve environmental management systems. This article examines the potential of different advanced technologies, such as artificial intelligence (AI), blockchain, big data, and the Internet of Things (IoT), within the context of environmental management systems. This article intends to offer valuable insights to researchers, practitioners, and policymakers by examining the potential uses of AI, blockchain, big data, and IoT in environmental management systems. The goal is to demonstrate how these advanced technologies can be leveraged to enhance sustainability, boost environmental performance, and yield favourable environmental results across different sectors and industries.

Keywords: stateczność wozów wiercących, dynamika wozów wiercących, badania modelowe, model dynamiczny, model fizyczny, model matematyczny, badania symulacyjne, narzędzia CAD/CAE

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Production Process Simulation as an Element of Industry 4.0 Implementation in a Concrete Factory

Conference, Multidisciplinary Aspects
of Production Engineering MAPE 2023

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Abstract: This article presents the use of industry 4.0 elements in a selected manufacturing company. The issue discussed here has been an implemented computer simulation of a certain production process, thanks to which the possibility of innovative logistics solutions has been estimated. The primary objective of the issue discussed has been to answer the question of whether the chosen solution would be profitable for the company. The case in question has been the subject of an engineering project carried out by the Production Engineering Department of the Faculty of Organisation and Management at the Silesian University of Technology.

Keywords: Industry 4.0, Production process, Process simulation, Production effectivity

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Proces wyrywania zespołu kotew jako metoda odspajania brył skalnych

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of Production Engineering MAPE 2023

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Abstract: W referacie przedstawiono wyniki analizy numerycznej dotyczącej kształtowania się strefy zniszczenia ośrodka skalnego pod działaniem zespołu kotew podcinających. W takim przypadku występuje efekt interakcji tzw. stożków zniszczenia prowadzący do zwiększenia objętości odspajanej bryły skalnej. Celem stworzenia optymalnej konfiguracji rozstawu otworów pod kotwy zależnie od parametrów technologicznych kotwienia (głębokość kotwienia, rozstaw kotew) oraz parametrów mechanicznych skały (w tym zwłaszcza wytrzymałości skały na rozrywanie), niezbędne jest prowadzenie badań numerycznych jak i terenowych. Prezentowane wyniki dotyczą analizy numerycznej w tym zakresie. Zagadnienie jest istotne dla opracowania skutecznej technologii odspajania brył skalnych w specjalnych warunkach zastosowania.

Keywords: kotwa podcinająca, interakcja stożków zniszczenia, Metoda Elementów Skończonych, symulacja numeryczna

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Innowacyjne materiały opakowaniowe z termokurczliwej folii LDPE produkowanej z recyklatów

Conference, Multidisciplinary Aspects
of Production Engineering MAPE 2023

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Abstract: W artykule przedstawiono wyniki prac B+R, które stanowią opracowanie innowacyjnych receptur, pozwalających na wdrożenie do działalności gospodarczej materiałów opakowaniowych o innowacyjnych cechach, przy jednoczesnym zachowaniu ich parametrów wytrzymałościowych. Diagnoza, z której wynikała potrzeba opracowania składu folii termokurczliwej opartego na udziale surowców wtórnych wynika wprost ze strategii firmy oraz szerokiej analizy stanu istniejącego. Po licznych konsultacjach przeprowadzonych z klientami na rynku regionalnym i zagranicznym, zaistniała konieczność opracowania produktu dostosowanego do zmieniających się uwarunkowań i prawodawstwa poprzez zastąpienie dotychczas stosowanych surowców pochodzenia ropopochodnego innymi surowcami a także recyklingu odpadów poprodukcyjnych realizując aspekty ochrony środowiska. Założeniem było otrzymanie następujących parametrów i funkcjonalności folii termokurczliwej w celu zmniejszenia objętości odpadów, zmniejszenia materiałochłonności:

- zastąpienie surowców pierwotnych surowcami pochodzącymi z recyklingu w ilości nie mniejszej niż 55%,
- dodatkowe obniżenie grubości o 10% dla opracowanej mieszanki.

Przedstawiono sposób otrzymywania jak również wpływ recyklatów, polietylenów liniowych i polietylenów średniej gęstości na właściwości mechaniczne, termiczne i optyczne. Na podstawie przeprowadzonych badań, stwierdzono że odpowiednie przygotowanie regranulatu oraz właściwy dobór mieszanki surowcowej pozwalają na otrzymanie folii termokurczliwej o zawartości min 55% recyklatów z jednoczesnym zachowaniem parametrów wytrzymałościowych.

Keywords: folia termokurczliwa, polietylen niskiej gęstości, opakowania, recyklat

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The Model Concept of Transfer Pricing Policy in MNEs in Relation to Strategic Management

Scientific Papers of Silesian University of Technology
– Organization & Management (2023)



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Purpose: Transactions carried out in the MNEs among parent companies and subsidiaries affect the achievement of the strategic and operational objectives of MNEs, their financial results, taxes paid and intra-group relations. The aim of the paper is to justify the need to extend the areas of strategic management in the MNEs with the tax area, in particular related to the valuation of transactions between entities in the group and the need to meet the obligations related to the transfer pricing. The practical aim of the article is to propose an original model of transfer pricing policy in MNEs, which may be adopted to increase the transparency of settlements and positive impact on operational and strategic effectiveness in the group.

Design/methodology/approach: The paper is based on a qualitative research. A content analysis of the law provisions and prior literature was a technique used for the collection of relevant data for building a model of transfer pricing policy.

Findings: Comprehensive and consistently implemented transfer pricing policy may help in optimizing the tax structure of the MNEs and in minimizing the risk associated with changes in tax provisions. As an instrument influencing operational relations and performance management in the MNEs, it can be a significant element of the strategic management of the group.

Practical implications: There is the relevant research impact upon the MNEs due to the possibility of applying and adopting a transfer pricing policy model proposed in the paper in order to support performance management in the group.

Social implications: Conducting business by multinational entities is often perceived negatively by society in the context of tax evasion. The implementation of a comprehensive transfer pricing policy promotes corporate tax transparency and increases employee tax awareness.

Originality/value: The originality of the article arises from a coherent combination of various areas resulting from intra-group transactions into one document model supporting the management of the subsidiaries on the one hand and acting in compliance with Polish and international law provisions on the other. The proposed model may be subject to further development of research.

Keywords: transfer pricing, management, corporate taxation, parent company, subsidiaries, accounting, compliance, MNEs, tax evasion, tax avoidance

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About Managing Knowledge for and in Smart Cities

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Abstract: The introductory part of the paper briefly presents a model for managing knowledge about the functioning of a city, understood as the linkage of urban and technical structures with the city's governing structures and its residents. This model was discussed in more detail in the author's earlier works. In particular, the proposed model presents, in matrix terms, the linkage of the task areas of city management with arbitrary proposed groups of stakeholders whose knowledge resources form the basis for both the current implementation by the relevant entities of the tasks of managing the urban organism, as well as for the processes of transforming the urban space into a smart space (Smart City). The main part of the paper shows the above-mentioned knowledge resources in the context of the possibilities and ways of their acquisition and creation with the use of acquired resources of knowledge bases and their IT instrumentation. Then the actual and potential difficulties and limitations in the processes of urban knowledge management and in the created smart urbanized space were shown, using selected examples. The final part of the article presents the concept of further research in the area in question.

Keywords: Smart City, stakeholders, knowledge management

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