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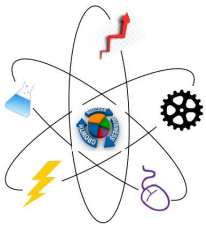

INNOVATIVE IDEAS IN SCIENCE IIS2016

SOCIAL AND TECHNOLOGICAL DEVELOPMENT 2016

BOOK OF ABSTRACTS

Baia Mare, Romania, November 10-11, 2016

The aim of the International Conference on *Innovative Ideas in Science IIS2016* is to provide an opportunity for academics, practitioners and researchers to debate new achievements or concepts, approaches and innovative practices within the continuously progressing world. This conference aims at including different fields of science under the general purpose of developing future interdisciplinary works and projects. Topics of the conference covers a comprehensive spectrum of issues from Engineering and Technology, Computer Sciences, Environmental Science, Economical Sciences, Fundamental Sciences, Medical and Health Sciences, Social Sciences, Humanities, etc. On the basis of more than 120 works presented at the conference, 69 selected papers have been included in this volume of IOP Conference Series: Materials Science and Engineering.

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Contents

Comparative analysis of the electroseparation results for the Aghires quartz sand in order to enrich it, using two types of active electrodes

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Tehnical University of Cluj Napoca, Electrotechnics and Measurements Department, Baritiu str., no. 26, Cluj Napoca, Romania

ABSTRACT

The paper presents the laboratory researches results regarding the Aghires quarts sand electroseparation, in two configurations for the ILES laboratory installation. The first studied configuration used a performant electrode (multi needles) from the endowment of the Intense Electric Field Laboratory from UTCN, while in the second analyzed configuration, the authors use an original multithreaded electrode, for which they have obtained an OSIM patent. The sand sample preparation for the electroseparation was made according to an original technological flow, proposed by the authors. The comparative analysis of the electroseparation results for the two configurations were made with the help of the statistical analysis program MODDE.5.

The comparative study reveals the fact that from the quantitative point of view the multi needles electrode type is preferred, while, in the case in which a superior enrichment is needed for the quartz sand, the multithreaded electrode is preferred. The enriched through electroseparation quartz sand, respectively with low content of Fe2O3, is an essential raw material in the porcelain industry.

Partial discharge measurements on 110kV current transformers. Setting the control value. Case study

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[2]Technical University Cluj Napoca, Romania, Department of Electrical Engineering, 26-28, George Barițiu street, 400027, Cluj-Napoca, Romania

ABSTRACT

The case study presents a series of partial discharge measurements, reflecting the state of insulation of 110kV CURRENT TRANSFORMERS located in Sibiu county substations. Measurements were performed based on electrical method, using MPD600: an acquisition and analysis toolkit for detecting, recording, and analyzing partial discharges. MPD600 consists of one acquisition unit, an optical interface and a computer with dedicated software. The system allows measurements of partial discharge on site, even in presence of strong electromagnetic interferences because it provides synchronous acquisition from all measurement points. Therefore, measurements, with the ability to be calibrated, do render:

– a value subject to interpretation according to IEC 61869-1:2007 + IEC 61869-2:2012 + IEC 61869-3:2011 + IEC 61869-5:2011 and IEC 60270: 2000;

– the possibility to determine the quantitative limit of PD (a certain control value) to which the equipment can be operated safely and repaired with minimal costs (relative to the high costs implied by eliminating the consequences of a failure) identified empirically (process in which the instrument transformer subjected to the tests was completely destroyed).

Determining insulation condition of 110kV instrument transformers. Linking PD measurement results from both gas chromatography and electrical method

C Dan1 and R Morar2

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[2]Technical University Cluj Napoca, Romania, Department of Electrical Engineering, 26-28, George Barițiu street, 400027, Cluj-Napoca, Romania

ABSTRACT

Working methods for on site testing of insulations:

Gas chromatography (using the TFGA-P200 chromatographer);

Electrical measurements of partial discharge levels using the digital detection, recording, analysis and partial discharge acquisition system, MPD600.

First performed, between 2000–2015, were the chromatographic analyses concerning electrical insulating environments of:

102 current transformers, 110kV. Items in operation, functioning in 110/20kV substations.

38 voltage transformers, 110kV also in operation, functioning in 110/20kV substations.

Then, electrical measurements of partial discharge inside instrument transformers, on site (power substations) were made (starting in the year 2009, over a 7-year period, collecting data until the year 2015) according to the provisions of standard EN 61869-1:2007 "Instrument transformers. General requirements", applying, assimilated to it, type A partial discharge test procedure, using as test voltage the very rated 110kV distribution grid voltage.

Given the results of two parallel measurements, containing:

to this type of failure specific gas amount (H_2) and
the quantitative partial discharge' level,

establishing a clear dependence between the quantity of partial discharges and the type and amount of in oil dissolved gases inside equipments affected by this type of defect: partial discharges, was expected.

Of the "population" of instrument transformers subject of the two parallel measurements, ***the dependency*** between $Q\ IEC$ (apparent charge) and (H_2) (hydrogen, gas amount dissolved within their insulating environment) ***represents a finite assemblage*** situated between the two limits developed on an empirical basis.

Research on the impact of LMX leadership theory on mutual trust and organisational commitment of employees in Bosnia and Herzegovina

E Strukan and M Nikolić

University of Novi Sad, Technical Faculty "Mihajlo Pupin", Serbia

ABSTRACT

The paper presents the theoretical foundations of leadership based on the LMX exchange leader-member theory which essentially involves leadership process where a continuous and creative interaction between leaders and followers is at the centre of attention, during which the leader, among other things, affects the degree of mutual trust and organisational commitment and the quality of relationships in his/her organisation, which actually has a direct impact on organisational performances, effectiveness of the organisation's business and its market positioning.

Also, the paper presents the results of research conducted in organisations in Bosnia and Herzegovina, which undoubtedly point to the fact that the dimensions of leadership based on the LMX exchange leader-member theory, is strongly correlated with the dimensions of mutual trust and organisational commitment, and to have a significant positive impact on them, and therefore on organisational performances and effectiveness of business organisations that were included in this study.

Estimation of coefficient of rolling friction by the evolvent pendulum method

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[2] "Carol Davila" University of Medicine and Pharmacy, Department 2 Physiology I, Bd. ErolilorSanitari no.8, Bucuresti, Romania

ABSTRACT

A major objective of tribological researches is characterisation of rolling friction, due to various cases encountered in classical engineering applications, like gear transmissions and cam mechanisms or more recent examples met in bioengineering and biomedical devices. A characteristic of these examples consists in reduced dimensions of the contact zones, theoretically zero, the relative motion occurring between the contact points being either sliding or rolling. A characteristic parameter for the rolling motion is the coefficient of rolling friction. The paper proposes a method for estimation of coefficient of rolling friction by studying the motion of a body of revolution on an inclined plane. Assuming the hypothesis that moment of rolling friction is proportional to the normal reaction force, the law of motion for the body on the inclined plane is found under the premise of pure rolling. It is reached the conclusion that there is an uniformly accelerated motion, and thus for a known plane slope, it is sufficient to find the time during which the body runs a certain distance, starting from motionless situation. To obtain accurate results assumes finding precisely the time of motion. The coefficient of rolling friction was estimated for several slopes of the inclined plane and it is concluded that with increased slope, the values of coefficient of rolling friction increase, fact that suggest that the proportionality between the rolling torque and normal load is valid only for domains of limited variations of normal load.

Valuation of coefficient of rolling friction by the inclined plane method

F C Ciornei[1] , S Alaci[1] , V I Ciogole[1] and M C Ciornei[2]

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[2] "Carol Davila" University of Medicine and Pharmacy, Department 2 Physiology I, Bd. EroliIorSanitari no.8, Bucuresti, Romania

ABSTRACT

A major objective of tribological researches is characterisation of rolling friction, due to various cases encountered in classical engineering applications, like gear transmissions and cam mechanisms or more recent examples met in bioengineering and biomedical devices. A characteristic of these examples consists in reduced dimensions of the contact zones, theoretically zero, the relative motion occurring between the contact points being either sliding or rolling. A characteristic parameter for the rolling motion is the coefficient of rolling friction. The paper proposes a method for estimation of coefficient of rolling friction by studying the motion of a body of revolution on an inclined plane. Assuming the hypothesis that moment of rolling friction is proportional to the normal reaction force, the law of motion for the body on the inclined plane is found under the premise of pure rolling. It is reached the conclusion that there is an uniformly accelerated motion, and thus for a known plane slope, it is sufficient to find the time during which the body runs a certain distance, starting from motionless situation. To obtain accurate results assumes finding precisely the time of motion. The coefficient of rolling friction was estimated for several slopes of the inclined plane and it is concluded that with increased slope, the values of coefficient of rolling friction increase, fact that suggest that the proportionality between the rolling torque and normal load is valid only for domains of limited variations of normal load.

Establish the CNC machining strategy in relation with geometric complexity of the parts made from aluminum alloy extruded profile

Ș A Moldovan, M Cosma and V Năsui

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ABSTRACT

In this paper we present a technological problem encountered in the machining accuracy of the parts for aerospace made of aluminum alloy extruded profile with length up to 10 meters. Those parts have very tight tolerances and on milling process appear several factors that influence the repeatability of machining processes. Several factors must be considered when developing the machining process for a specific part, including: establishing the machining strategy in relation with piece geometric complexity, analysis of machined parts through coordinate measuring machine and statistical analysis, to determinate the proper machining strategy for obtaining parts in tolerance. Through several tests and recording all dimensions changes during the milling process, will be modified the machining strategy. By analysing the machining strategy at different lengths of extrusions and records of dimensions fluctuations along the processing chain has been created a proper machine strategy which will obtain a repeatability of the machining process.

LabVIEW application for motion tracking using USB camera

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ABSTRACT

The technical state of the contact line and also the additional equipment in electric rail transport is very important for realizing the repairing and maintenance of the contact line. During its functioning, the pantograph motion must stay in standard limits. Present paper proposes a LabVIEW application which is able to track in real time the motion of a laboratory pantograph and also to acquire the tracking images. An USB webcam connected to a computer acquires the desired images. The laboratory pantograph contains an automatic system which simulates the real motion. The tracking parameters are the horizontally motion (zigzag) and the vertically motion which can be studied in separate diagrams. The LabVIEW application requires appropriate tool-kits for vision development. Therefore the paper describes the subroutines that are especially programmed for real-time image acquisition and also for data processing.

Composites materials for friction and braking application

A L Crăciun, C Pinca-Bretotean, C Birtok-Băneasă and A Josan

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ABSTRACT

The brake pads are an important component in the braking system of automotive. Materials used for brake pads should have stable and reliable frictional and wear properties under varying conditions of load, velocity, temperature and high durability. These factors must be satisfied simultaneously which makes it difficult to select effective brake pads material. The paper presents the results of the study for characterisation of the friction product used for automotive brake pads. In the study it was developed four frictional composites by using different percentages of coconut fibres (0%, 5%, 10%, 15%) reinforcement in aluminium matrix. The new composites tested in the laboratory, modelling appropriate percentage ratio between matrix and reinforcement volume and can be obtained with low density, high hardness properties, good thermal stability, higher ability to hold the compressive force and have a stable friction coefficient. These characteristics make them useful in automotive industry.

Research on the influence of moulding-casting technology on the quality of castings

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ABSTRACT

The quality of castings has a particularly role in the Romanian foundries. In this context, quality assurance is the overall objective of the foundries. The paper presents the critical analysis performed on moulding-casting technology of the type Lifting mechanism. This casting is a subset of the lifting and rotating mechanism of the furnace vault. The casting analysed is a medium size, with weight of 114 kg. The current moulding-casting technology involves moulding into three mould-parts leading to the occurrence of defects (decentering of the core, displacement of the lower mould and the middle mould and occurrence of burrs in area separated. Thus, to reduce the percentage of defects registered in industrial practice is necessary to change the moulding-casting technology. This requires the use of two mould-parts, re-dimensioning of the core and the core box and dimensioning of the runner network. The adoption of these changes in industrial practice has direct implications on the cost of casting and foundry costs default.

Reducing emissions by using special air filters for internal combustion engines

C Birtok-Băneasă, S A Raţiu, V Alexa, A L Crăciun, A Josan and A Budiul-Berghian

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ABSTRACT

This paper presents the experimental methodology to carry out functional performance tests for an air filter with a particular design of its housing, generically named *Super absorbing YXV "Air by Corneliu"*, patented and homologated by the Romanian Automotive Registry, to which numerous prizes and medals were awarded at national and international innovations salons. The tests were carried out in the Internal Combustion Engines Laboratory, within the specialization "Road vehicles" belonging to the Faculty of Engineering Hunedoara, component of Politehnica University of Timisoara. The scope of the study is to optimise the air intake into the engine cylinders by reducing the gas-dynamic resistances caused by the air filter and, therefore, to achieve higher energy efficiency, i.e. fuel consumption reduction and engine performance increase. We present some comparative values of various operating parameters of the engine fitted, in the first measuring session, with the original filter, and then with the studied filter. The data collected shows a reduction in fuel consumption by using this type of filter, which leads to lower emissions.

From design to manufacturing of asymmetric teeth gears using computer application

F Suciu, A Dascalescu and M Ungureanu

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ABSTRACT

The asymmetric cylindrical gears, with involutes teeth profiles having different base circle diameters, are nonstandard gears, used with the aim to obtain better function parameters for the active profile. We will expect that the manufacturing of these gears became possible only after the design and realization of some specific tools. The paper present how the computer aided design and applications developed in MATLAB, for obtain the geometrical parameters, in the same time for calculation some functional parameters like stress and displacements, transmission error, efficiency of the gears and the 2D models, generated with AUTOLISP applications, are used for computer aided manufacturing of asymmetric gears with standard tools. So the specific tools considered one of the disadvantages of these gears are not necessary and implicitly the expected supplementary costs are reduced. The calculus algorithm established for the asymmetric gear design application use the "direct design" of the spur gears. This method offers the possibility of determining first the parameters of the gears, followed by the determination of the asymmetric gear rack's parameters, based on those of the gears. Using original design method and computer applications have been determined the geometrical parameters, the 2D and 3D models of the asymmetric gears and on the base of these models have been manufacturing on CNC machine tool asymmetric gears.

The impact of overhead lines for employees with stents

P Syrek and M Skowron

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ABSTRACT

The aim of article is to discuss interaction between stents implanted in the body of worker and harmonic magnetic field in the vicinity of electric wires. In last decades, a growing proportion of people has any devices implanted, to list: cardiac pacemakers, cardioverter – defibrillators. Recommendations of International Commision on Non-ionizing Radiation Protection (ICNIRP), and resctrictions imposed in different states, may exlude specific individuals from their duties. The autors focused on the situation, when the employee with stent, works in the immediate vicinity of overhead electric wires, cleaning with dry ice the electric insulators.

Study of electromagnetic radiation produced by household equipment

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ABSTRACT

This paper presents the experimental study of electromagnetic radiation produced by different household equipment. Measurements were performed at various distances from the tested devices and in different operating modes of these, using the FA306 electromagnetic field analyzer. Also, it has been analyzed the cumulative effect of multiple sources. The experiments allowed the identification of measures to minimize the effects of exposure to artificial electromagnetic radiation produced by electrical household equipment.

The optimization of the position and the magnitude of the clamping forces in machining fixtures

V G Cioată, I Kiss, V Alexa and S A Raţiu

Politehnica University of Timisoara, Engineering and Management Department, 5 Revolution Street, Hunedoara, 331128, Romania

ABSTRACT

This paper presents a method which allows the optimization of the position and magnitude of the clamping forces for a specific case of processing: milling of a canal in a prismatic workpiece, using a multi-objective method, implemented with ANSYS software. The design variables are location dimensions of clamping elements, whose range of variation is determined by constructive and dimensional considerations of the workpiece-fixture assembly and the magnitude of the clamping forces. The objective functions of optimization are to minimize the maximum total displacement of the selected edge and to minimize the maximum equivalent stress in workpiece. The constraint is the magnitude of the contact forces between locators and the piece's surfaces to be greater than zero. Values of the design variables which meet the objective functions were obtained after the simulation was performed.

An analysis of the oscillatory movements of the suspension ropes for an elevator with parabolic speed modeling and continuous deceleration

I Craciun, M Ungureanu and D Stoicovici

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ABSTRACT

In order to insure passengers' security and smooth functioning, elevators benefit from speed modeling. The paper aims to compare the evolution of the kinematic parameters (acceleration, speed, amplitude) of the oscillatory movements performed by the suspension ropes of the elevator cabin, considering speed variation at start and stop realized using S – curves generated from arches of parabolic curves. Usually, the functioning cycle of an elevator ends with a short period of constant speed traveling, in order to insure levelling of the cabin. We have already made a comparative analysis of the oscillatory movements of the suspension ropes, considering three varieties of speed modeling: with trapezoidal variation of acceleration, with parabolic variation of acceleration and with cosinusoidal variation of acceleration. The paper aims to analyze the possibility to remove the levelling period, and the impact of this upon the kinematic parameters of the oscillatory movements performed by the suspension ropes. We will take into consideration two possibilities of deceleration: with levelling step and with continuous variation of speed. In both cases, for comparison, the same duration of the acceleration period and deceleration period will be considered.

The application of the electrodynamic separator in minerals beneficiation

M Skowron[1], P Syrek[1] and A Surowiak[2]

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[1]Department of Electrical and Power Engineering,
[2]Faculty of Mining and Geoengineering, Department of Environmental Engineering and Mineral Processing,

ABSTRACT

The aim of presented paper is elaboration of methodology of upgrading natural minerals in example of chalcocite and bornite sample. The results were obtained by means of laboratory drum separator. This device operates in accordance to properties of materials, which in this case was electrical conductivity. The study contains the analysis of the forces occurring inside of electrodynamic separator chamber, that act on the particles of various electrical properties. Both, the potential and electric field strength distributions were calculated, with set of separators setpoints. Theoretical analysis influenced on separator parameters, and hence impacted the empirical results too. Next, the authors conducted empirical research on chalcocite and bornite beneficiation by means of electrodynamic separation. The results of this process were shown graphically in form of upgrading curves of chalcocite considering elementary copper and lead.

Theoretical and methodological foundations of sustainable development of Geosystems

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[4] Ivan Franko National University of Lviv, Faculty of Foreign Languages, Department of English Philology, Universytetska str., 1, 79000, Lviv, Ukraine

ABSTRACT

The theoretical and methodological foundations of sustainable development of Geosystems were further evolved. It was grounded the new scientific direction "constructive Hydroecology" - the science that studies the Hydrosphere from the standpoint of natural and technogenic safety based on geosystematical approach. A structural separation for constructive Hydroecology based on objective, subjective, and application characteristics was set. The main object of study of the new scientific field is the hydroecological environment under which the part of Hydrosphere should be understood as a part of the multicomponent dynamic system that is influenced by engineering and economical human activities and, in turn, determines to some extent this activity.

Foreign direct investments and their impact on the economic development of Bosnia and Herzegovina

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ABSTRACT

From the perspective of macroeconomic indicators, investment is a significant determinant of economic development in general, as well as the development indicator of economic entities in the micro segment. Investments are an essential element of any economic policy, because their implementation provides a platform not only for economic development, but also are prerequisite for the stability of economic and social trends. Foreign direct investment plays an important role in the financing of the global economy, and it represents the most frequent feature in financing the national economies of developing countries and countries in transition. Demand for foreign investment in the global market is large, and thus the governments have been conducting many activities in order to create a more favorable environment to attract investors.

In this paper, special attention was paid to direct investments in financing the economy on a global scale, their importance for the development of the global economy and the impact of foreign direct investment in the economic development of Bosnia and Herzegovina. The major activities, which are necessary to be done to attract investments in the highest possible volume, have been emphasized. With the use of statistical and quantitative analysis, the paper shows that the inflow of foreign capital is one of the basic prerequisite of economic growth acceleration and that the inflow of foreign capital has a positive impact on the economic development of Bosnia and Herzegovina. By monitoring and analyzing the various instruments of foreign capital inflow, with an emphasis on investment in the free zone and a joint venture with foreign investors, it has been clearly pointed out the fact that they have diverse, but proven positive impact on macroeconomic variables in the economy of Bosnia and Herzegovina.

The application of CAD / CAM technology in Dentistry

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ABSTRACT

Information and communication technologies have found their application in the healthcare sector, including the frameworks of modern dentistry. CAD / CAM application in dentistry is the process by which is attained finished dental restoration through fine milling process of ready ceramic blocks. CAD / CAM is an acronym of english words Computer-Aided-Design (CAD) / Computer-Aided-Manufacture (CAM), respectively dental computer aided design and computer aided manufacture of inlays, onlays, crowns and bridges. CAD / CAM technology essentially allows you to create a two-dimensional and three-dimensional models and their materialization by numerical controlled machines. In order to operate more efficiently, reduce costs, increase user/patient satisfaction and ultimately achieve profits, many dental offices in the world have their attention focused on implementation of modern IT solutions in everyday practice. In addition to the specialized clinic management software, inventory control, etc., or hardware such as the use of lasers in cosmetic dentistry or intraoral scanning, recently the importance is given to the application of CAD / CAM technology in the field of prosthetic. After the removal of pathologically altered tooth structure, it is necessary to achieve restoration that will be most similar to the anatomy of a natural tooth. Applying CAD / CAM technology on applicable ceramic blocks it can be obtained very quick, but also very accurate restoration, in the forms of inlays, onlays, bridges and crowns.

The paper presents the advantages of using this technology as well as satisfaction of the patients and dentists by using systems as: Cercon, Celay, Cerec, Lava, Everest, which represent imperative of modern dentistry in creating fixed dental restorations.

Statistical analysis using the multiple regression research in areas of the indefinite chilled cast–iron rolls manufacturing

I Kiss, V Alexa and V G Cioată

University Politehnica Timisoara, Faculty of Engineering Hunedoara, Department of Engineering and Management, Hunedoara, Romania

ABSTRACT

To analyze the metallurgical processes is used, mainly, the statistical fundamental methods that permit to draw conclusions, from the observed values, about the repartition of the frequencies of various parameters, about their interaction, about verification validity of certain premises, and about the research of the dependencies among different parameters. In this sense, the realization of optimum chemical compositions of the cast–iron can constitute a technical efficient way to assure the exploitation properties, the material from which the rolling mills rolls are manufactured having an important role in this sense. This paper reviews key aspects of roll material properties and presents an analysis of the influences of chemical composition upon the mechanical properties of the indefinite cast iron rolls. Now, using the multivariate research, we present some mathematical correlations and graphical interpretations between the hardness and the chemical composition. Using the double and triple correlations variation boundaries for the chemical composition, in view the obtaining the optimal values of the hardness of indefinite cast iron rolls, are obtained. The partial results and evidence obtained by actual experiments are presented. For the multiple regression equations, correlation coefficients and graphical representations the software MATLAB was used.

Multivariate research in areas of phosphorus cast–iron brake shoes manufacturing using the statistical analysis and the multiple regression equations

I Kiss, V G Cioată, V Alexa and S A Raţiu

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ABSTRACT

The braking system is one of the most important and complex subsystems of railway vehicles, especially when it comes for safety. Therefore, installing efficient safe brakes on the modern railway vehicles is essential. Nowadays is devoted attention to solving problems connected with using high performance brake materials and its impact on thermal and mechanical loading of railway wheels. The main factor that influences the selection of a friction material for railway applications is the performance criterion, due to the interaction between the brake block and the wheel produce complex thermos–mechanical phenomena. In this work, the investigated subjects are the cast–iron brake shoes, which are still widely used on freight wagons. Therefore, the cast–iron brake shoes – with lamellar graphite and with a high content of phosphorus (0.8–1.1%) – need a special investigation. In order to establish the optimal condition for the cast–iron brake shoes we proposed a mathematical modelling study by using the statistical analysis and multiple regression equations. Multivariate research is important in areas of cast–iron brake shoes manufacturing, because many variables interact with each other simultaneously. Multivariate visualization comes to the fore when researchers have difficulties in comprehending many dimensions at one time. Technological data (hardness and chemical composition) obtained from cast–iron brake shoes were used for this purpose. In order to settle the multiple correlation between the hardness of the cast–iron brake shoes, and the chemical compositions elements several model of regression equation types has been proposed. Because a three–dimensional surface with variables on three axes is a common way to illustrate multivariate data, in which the maximum and minimum values are easily highlighted, we plotted graphical representation of the regression equations in order to explain interaction of the variables and locate the optimal level of each variable for maximal response. For the calculation of the regression coefficients, dispersion and correlation coefficients, the software Matlab was used.

Innovative methods of popularizing technical education

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ABSTRACT

There have been analyzed reasons of the loss of technical education's popularity. Also, the analysis of known educational and production methods, oriented at the innovative model of development of society, was performed. It is stated that the acquisition of 21st century's skills as a result of competition of technical education are natural for the DIY ideology, which was realized in the institutions like Fab Lab. The new educational strategy, based on project-based learning, is proposed to be implemented as a special laboratory with equipment, which would be a center of innovative development for students at the Technical University. Moreover, the list of projects planned for implementation, that includes not only projects, specific to a particular university, but also projects, demanded by society as a whole, is specified. It is worth to implement trendy projects in the laboratory, such as toy-like, ecological projects; projects of the energy dependence decrease or the energy efficiency increase, modern digital or innovative projects etc. The student should gain knowledge, skills and, possibly, equipment that are available for immediate usage on the labor market or for the realization of his own projects or the community's projects in everyday life after the realization of the particular project at the laboratory.

Safety of the shaft-wheel assembly of electric locomotives

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ABSTRACT

Shafts of electric locomotives are exposed to complex normal and tangential stresses during its exploitation. These stresses could have extremely high level producing the breakage of the shaft. It is well known that shafts have much longer service life than wheels. However, since the stresses in shaft's material are high, it is possible to micro-cracks appear and propagate until the shaft's breakage. The breakage of the shaft may cause the great human and material losses. Because of that, during manufacturing these assemblies it must be taken into account all parameters which can initiate shaft crack. Geometric measure of seating and shaft are recommended by UIC regulations having great influence to quality and safety of realized assembly. The influence of contact surfaces and their lubrication during manufacturing the shaft - wheel assembly is shown in this paper.

The heavy metal ions (Cu^{2+}, Zn^{2+}, Cd^{+}) toxic compounds influence on triticale plants growth

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ABSTRACT

The presence of the heavy metals toxic compounds ($CuSO_4 \cdot 5H_2O$, $ZnSO_4 \cdot 7H_2O$ and $3CdSO_4 \cdot 8H_2O$) in water and soil can be observed by their negative effects on the germination and growth process for different vegetable (barley, oat, maize) who are used for human and animal consumption. This paper it aims the determination of germination and growth inhibition negative effects for triticale plants in the heavy metals ions presence by ecotoxicological laboratory tests. The triticale plants was chosen for their different characteristics to the other grasses respectively: a very good resistance for a wide range of diseases, an accelerated growth and a very good tolerance for aluminum ions presents in acid soils. The determinations were conducted step by step, first, we put the triticale grains in contact with the heavy metal solutions with different concentration then for 3 days we noticed the triticale germination inhibition effects and finally we noticed the growth inhibition process for triticale plants respectively in 7^{th} and 9^{th} day from the start of the experiment. At the end of the tests we can conclude that the triticale roots have a very great sensibility to a $CuSO_4$ solutions compared to the effects for their stalks. A positive effect for triticale stalks we can see for low $CuSO_4$ solution concentrations thus for 5 mg Cu/l the growth is 19,44%. A positive effect for triticale roots it can see for low $ZnSO_4$ solution concentrations so for 5 – 15 mg Zn/l the growth is 24,4%. In the presence of the $CdSO_4$ solution all the processes are inhibited (germination and growth for triticale plants) even for a low concentrations for this toxic.

Audit in public administration's information systems – External or internal?

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ABSTRACT

Audit of the information system, thanks to the increased use of ICT and related cyber-crime, becomes a very important process in modern companies and institutions. It is usual to engage or outsource a third party for independent financial audit. But what about auditing of the information system of public administration institutions? This paper gives an introduction to possible aspects of information system's audit with the aim to discuss possible answer on the question in the title.

Particulate matter urban air pollution from traffic car

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ABSTRACT

The particulate matters (PM) are very important compounds of urban air pollution. There are a lot of air pollution sources who can generate PM and one of the most important of them it is urban traffic car. Air particulate matters have a major influence on human health so everywhere are looking for PM reducing solutions. It is knows that one of the solution for reduce the PM content from car traffic on ambient urban air is the fluidity of urban traffic car by introduction the roundabout intersections. This paper want to present some particulate matter determinations for PM10 and PM2.5 conducted on the two types of urban intersection respectively traffic light and roundabout intersections in Baia Mare town in the approximate the same work conditions. The determinations were carried out using a portable particulate matter monitor Haz – Dust model EPAM – 5000, who can provide a real time data for PM10, PM 2.5.Determinations put out that there are differences between the two locations regarding the PM content on ambient air. On roundabout intersection the PM content is less than traffic light intersection for both PM10 and PM 2.5 with more than 30%.

Migration of optical core network to next generation networks – Carrier Grade Ethernet Optical Transport Network

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ABSTRACT

In order to maintain the continuity of the telecom operators' network construction, while monitoring development needs, increasing customers' demands and application of technological improvements, it is necessary to migrate optical transport core network to the next generation networks - Carrier Grade Ethernet Optical Transport Network (OTN CE). The primary objective of OTN CE is to realize an environment that is based solely on the switching in the optical domain, i.e. the realization of transparent optical networks and optical switching to the second layer of ISO / OSI model. The realization of such a network provides opportunities for further development of existing, but also technologically more demanding, new services. It is also a prerequisite to provide higher scalability, reliability, security and quality of QoS service, as well as prerequisites for the establishment of SLA (Service Level Agreement) for existing services, especially traffic in real time. This study aims to clarify the proposed model, which has the potential to be eventually adjusted in accordance with new scientific knowledge in this field as well as market requirements.

Grain refinement of 7075Al alloy microstructures by inoculation with Al-Ti-B master alloy

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ABSTRACT

This paper aims to bring some clarification on grain refinement and modification of high strength alloys used in aerospace technique. In this work it was taken into account 7075 Al alloy, and the melt treatment was carried out by placing in the form of master alloy wire ternary AlTiB the casting trough at 730°C. The morphology of the resulting microstructures was characterized by optical microscopy. Micrographs unfinished and finished with pre-alloy containing ternary Al5Ti1B evidence fine crystals, crystal containing no columnar structure and highlights the size of the dendrites, and intermetallic phases occurring at grain boundaries in Al-Zn-Mg-Cu alloy. It has been found that these intermetallic compounds are $MgZn_2$ type. AlTiB master alloys finishing ensures a fine eutectic structure, which determines the properties of hardware and improving the mechanical properties of aluminum alloys used in aeronautical engineering.

Challenges of human resource management in the institutions for care of elderly people

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ABSTRACT

Human resources are the most important resources of any work organization or institution. They are the bearers of the work process and are key in determining the quality of a product or service. The staff employed in an institution contributes with their work to its business success which is why the institution management should pay close attention to human resources management. Functionally, the successful management of social protection institutions implies the attainment of balance in the process of satisfying interests of beneficiaries, interests of the institution management (founder-owner), and interests of the employees (service providers to elderly people). Interests of beneficiaries (elderly people) who are placed in residential care are reflected in the need for high quality and accessible services. Interests of the institution management are recognized as the need to achieve economically sustainable and profitable institution. An interest of direct service providers (employed caregivers, social workers, etc.) is in the safe premises and good working conditions. The term "human resources" in institutions of social protection implies overall knowledge, skills, abilities, creative capabilities, motivation, loyalty and personal characteristics owned by employees in the institution. It is the overall intellectual and emotional energy of employees that the management can count on and that can be engaged to achieving the objectives of the institution. The objectives of human resource management in social protection institutions are related to providing capability with job demands, fulfillment of professional and optimal number of competent workers, improving socio-economic status of employees, ensuring full time engagement of workers, improving the quality of work conditions and work environment, creating and maintaining a flexible and adaptive potential of employees, reducing resistance and increasing the sensitivity of employees to changes in the institution. The activities carried out in pursuit of the objectives of human resource management in institutions for the elderly are analysis and planning of working positions, recruitment and selection of candidates, socialization, training and professional development of workers, performance assessment and evaluation, reward and motivation, the determination of salaries, information, development of interpersonal relations, supervision and support to employees (prevention of "professional burnout"), ensuring the realization of the legal rights (regularity of salaries and contributions, affairs and records related to employment, health and safety at work etc.) The absence of these activities or lack of attention to achieving the objectives of human resources management calls in question the basic sense of existence of institutions for care of the elderly, and this is to provide a decent life to an elderly person.

Agile methodology selection criteria: IT start-up case study

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ABSTRACT

Project management in modern IT companies is often based on agile methodologies which have several advantages compared to traditional methodologies such is waterfall. Having in mind that clients sometimes change project during development it is crucial for an IT company to choose carefully which methodology is going to implement and is it going to be mostly based on one or is it going got be combination of several. There are several modern and often used methodologies but among those Scrum, Kanban and XP programming are usually the most common. Sometimes companies use mostly tools and procedures from one but quite often they use some of the combination of those methodologies. Having in mind that those methodologies are just a framework they allow companies to adapt it for their specific projects as well as for other limitations. These methodologies are in limited usage Bosnia but more and more IT companies are starting to use agile methodologies because it is practice and common not just for their clients abroad but also starting to be the only option in order to deliver quality product on time. However it is always challenging which methodology or combination of several companies should implement and how to connect it to its own project, organizational framework and HR management. This paper presents one case study based on local IT start up and delivers solution based on theoretical framework and practical limitations that case company has.

Empirical evidences of owners' managerial behaviour - the case of small companies

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ABSTRACT

In a small firm, the founder or the owner-manager often leaves his or her own personal “stamp” on the way things are done, finding solutions for the multitude of problems the firm faces, and maintaining control over the firm’s operations. The paper aims to investigate the degree to which the owner-managers are controlling the operations of their firm on a day-to-day basis or even getting involved into the management of the functional areas. Our empirical research, conducted on a sample of 200 small and medium-sized enterprises (SME) from the North-Western Romania, Maramures (NUTS3 level - RO114), shows that owner-managers tend to be all-powerful, making decisions based on their experience. Furthermore, the survey highlights the focus of owner-managers on two functional areas, namely the production, and sales and marketing. Finally, the correlation analysis states that in the case of small firms, the owner-manager is more involved in managing the functional areas of the firm, as compared to the medium-ones.

Software architecture for a multi-purpose real-time control unit for research purposes

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ABSTRACT

A new, freely programmable, scalable control system for academic research purposes was developed. The intention was, to have a control unit capable of handling multiple PT1000 temperature sensors at reasonable accuracy and temperature range, as well as digital input signals and providing powerful output signals. To take full advantage of the system, control-loops are run in real time. The whole eight bit system with very limited memory runs independently of a personal computer. The two on board RS232 connectors allow to connect further units or to connect other equipment, as required in real time. This paper describes the software architecture for the third prototype that now provides stable measurements and an improvement in accuracy compared to the previous designs. As test case a thermal solar system to produce hot tap water and assist heating in a single-family house was implemented. The solar fluid pump was power-controlled and several temperatures at different points in the hydraulic system were measured and used in the control algorithms. The software architecture proved suitable to test several different control strategies and their corresponding algorithms for the thermal solar system.

Real time capable control design with increased life expectancy for research purposes

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ABSTRACT

A new, freely programmable, scalable control system for academic research purposes was developed. The intention was, to have a control unit capable of handling multiple PT1000 temperature sensors at reasonable accuracy and temperature range, as well as digital input signals and providing more powerful output signals at 230V AC than conventional control units. To take full advantage of the system, control-loops are run in real time. The whole system runs independently of a personal computer. The two on-board RS232 connectors allow to connect further units to use more sensors or actuators or to connect other laboratory equipment, as required. To allow usage for long-time experiments, systematically electronic components with low failure-in-time (FIT) rate have been chosen in order to achieve high life expectancy. This paper describes the third prototype, which now provides stable measurements, and an improvement in accuracy compared to the previous designs. A rough estimation about the expected mean time between failures is given. As test case, a thermal solar system to produce hot tap water and assist heating in a single-family house was implemented. The solar fluid pump was power-controlled and several temperatures at different points in the hydraulic system were measured and used in the control algorithms. The hardware design proved suitable to test several different control strategies and their corresponding algorithms for the thermal solar system.

Retrofit concept for small safety related stationary machines

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ABSTRACT

More and more old machines have the problem that their control electronics' lifecycle comes to its intended end of life, whilst the mechanics itself and process capability is still in very good condition. This article shows an example of a reactive ion etcher originally built in 1988, which was refitted with a new control concept. The original control unit was repaired several times based on manufacturer's obsolescence management. At start of the retrofit project the integrated circuits were no longer available for further repair of the original control unit. Safety, repeatability and stability of the process were greatly improved.

Research on the injectors remanufacturing

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ABSTRACT

During the remanufacturing process, the injector body - after disassembling and cleaning process - should be subjected to some strict control processes, both visually and by an electronic microscope, for evidencing any defects that may occur on the sealing surface of the injector body and the atomizer. In this paper we present the path followed by an injector body in the process of remanufacturing, exemplifying the verification method of roughness and hardness of the sealing surfaces, as well as the microscopic analysis of the sealing surface areas around the inlet. These checks can indicate which path the injector body has to follow during the remanufacturing. The control methodology of the injector body, that is established on the basis of this research, helps preventing some defective injector bodies to enter into the remanufacturing process, thus reducing to a minimum the number of remanufactured injectors to be declared non-conforming after final verification process.

System monitoring feedback in cinemas and harvesting energy of the air conditioning condenser

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ABSTRACT

Our article monitors the degree of emotional involvement of the audience in the action film in theaters by measuring the concentration of CO2. The software performs data processing obtained dispersion sensors and displays data during the film. The software will also trigger the start of the air conditioning condenser where we can get harvesting energy by installing a piezoelectric device. Useful energy can be recovered from various waste produced in cinema. The time lag between actions and changes in environmental systems determines that decisions made now will affect subsequent generations and the future of our environment.

Modelling pressure rolling of asymmetric rolling process

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ABSTRACT

The paper presents a comparative analysis between experimental results and modelling in order to interpret the value of the contact pressure on the asymmetric longitudinal rolling. It is also intended action and the different behaviour of upper cylinder compared to the lower cylinder action in situations when both are driven, or only one operates. In the modelling will be presented on the basis of boundary conditions imposed rolling pressure variation in the degree of reduction and also re size arc length of contact. Determining a curve is also important to determine the locus of points which characterize symmetry conditions partial rolling process between unequal diameters cylinders.

Allelopathy relationship between plants and their use in organic farming

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ABSTRACT

Allelopathy is a process still little studied in the plant world, if we refer to the diversity of biochemical compounds, through which plants can interact with each other, with fungi or bacteria. Biochemical "dialogue" between organisms may have stimulatory or inhibitory effects, contributing to numerical setting of the populations, the assertion of some species over others, the establishment and strengthen of plant communities. Practically, the allelopathy can be exploited in organic farming in understanding and identifying compatibility between species, to finding natural substances with herbicide potential. In experiments conducted, diluted extracts of Taraxacum officinale and Cirsium vulgare strongly inhibited the germination and growth of corn and beans, while Hedera helix produced the same effect, but at higher concentrations of the extract. Humulus lupulus extract has a stimulating effect on the two species and it is possible to use as natural fertilizer. Extracts of Chenopodium album works as stimulator for Beta vulgaris, and potent inhibitor for Triticum aestivum. Agropyron repens is an aggressive competitor for Lycopersicon esculentum and Capsicum annuum, producing a strong inhibition. Juglans regia extracts and especially those of Satureja hortensis, can be used as natural herbicides for up delay germination and growth suppression for the species: Echinochloa crus-galli and Setaria glauca.

The possibility of developing hybrid PV/T solar system

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ABSTRACT

An alternative and cost-effective solution to developing integrated PV system is to use hybrid photovoltaic/thermal (PV/T) solar system. The temperature of PV modules increases due to the absorbed solar radiation that is not converted into electricity, causing a decrease in their efficiency. In hybrid PV/T solar systems the reduction of PV module temperature can be combined with a useful fluid heating. In this paper we present the possibility of developing a new hybrid PV/T solar system. Hybrid PV/T system can provide electrical and thermal energy, thus achieving a higher energy conversion rate of the absorbed solar radiation. We developed PV/T prototype consisted of commercial PV module and thermal panel with our original solution of aluminium absorber with special geometric shapes. The main advantages of our combined PV/T system are: removing of heat from the PV panel; extending the lifetime of photovoltaic cells; excess of the removing heat from PV part is used to heat the fluid in the thermal part of the panel; the possibility of using on the roof and facade constructions because less weight.

A combined approach of AHP and TOPSIS methods applied in the field of integrated software systems

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ABSTRACT

Adopting the most appropriate technology for developing applications on an integrated software system for enterprises, may result in great savings both in cost and hours of work. This paper proposes a research study for the determination of a hierarchy between three SAP (System Applications and Products in Data Processing) technologies. The technologies Web Dynpro -WD, Floorplan Manager - FPM and CRM WebClient UI - CRM WCUI are multi-criteria evaluated in terms of the obtained performances through the implementation of the same web business application. To establish the hierarchy a multi-criteria analysis model that combines the AHP (Analytic Hierarchy Process) and the TOPSIS (Technique for Order Preference by Similarity to Ideal Solution) methods was proposed. This model was built with the help of the SuperDecision software. This software is based on the AHP method and determines the weights for the selected sets of criteria. The TOPSIS method was used to obtain the final ranking and the technologies hierarchy.

Critical study of current situation of Vrănicioara tailing pond on Cavnicului Valley, risks and consequences

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ABSTRACT

In northern Romania, there are numerous tailing ponds, resulting from mining activities that present significant environmental risks. Some of them, including Vrănicioara tailing pond, were the subject of technical projects for ecological rehabilitation. Vrănicioara pond is located on the right side of Cavnic Valley, downstream Cavnic town, about 4 kilometers far. It has about 500 m length and is located parallel to the road linking Baia Sprie and Cavnic localities. Chemical and physical stability of the tailing pond before rehabilitation interest the research, analysis and conclusions were published in several scientific meetings. In addition, close to the pond at less than 100 m, an open pit has developed, exploiting andesite by mining blast, increasing the risk of physical stability by continuous exposure to vibration. This activity currently continues, advancing towards the tailing pond body. The critical study addresses the current state of Vrănicioara Tailing Pond, analysis of some rehabilitation works done incorrectly, analysis of chemical stability that was not a priority during rehabilitation. Research intention is heading to water analysis confirming the existence of acid drainage that was not stopped or at least reduced. The scientific approach is based on the Technical Standards for Waste Deposits, in force in Romania, providing the rules to ensure physical and chemical stability.

Harvesting energy an sustainable power source, replace batteries for powering WSN and devices on the IoT

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ABSTRACT

Harvesting energy from nonconventional sources in the environment has received increased attention over the past decade from researchers who study these alternative energy sources for low power applications. Although that energy harvested is small and in the order of milliwatt, it can provide enough power for wireless sensors and other low-power applications. In the environment there is a lot of wasted energy that can be converted into electricity to power the various circuits and represents a potentially cheap source of power. Energy harvesting is important because it offers an alternative power supply for electronic devices where is does not exist conventional energy sources. This technology applied in a wireless sensor network (WSN) and devices on the IoT, will eliminate the need for network based energy and conventional batteries, will minimize maintenance costs, eliminate cables and batteries and is ecological. It has the same advantage in applications from remote locations, underwater, and other hard to reach places where conventional batteries and energy are not suitable. Energy harvesting will promote environmentally friendly technologies that will save energy, will reduce CO2 emissions, which makes this technology indispensable for achieving next generation smart cities and sustainable society. In response to the challenges of energy, in this article we remind the basics of harvesting energy and we discuss the various applications of this technology where traditional batteries cannot be used.

Software for improving the quality of project management, a case study: international manufacture of electrical equipment

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ABSTRACT

Production conditions in today`s world require software support at every stage of production and development of new products, for quality assurance and compliance with ISO standards. In addition to ISO standards such as usual metrics of quality, companies today are focused on other optional standards, such as CMMI (Capability Maturity Model Integrated) or prescribing they own standards. However, while there is intensive progress being made in the PM (project management), there is still a significant number of projects, at the global level, that are failures. These have failed to achieve their goals, within budget or timeframe. This paper focuses on checking the role of software tools through the rate of success in projects implemented in the case of internationally manufactured electrical equipment. The results of this research show the level of contribution of the project management software used to manage and develop new products to improve PM processes and PM functions, and how selection of the software tools affects the quality of PM processes and successfully completed projects.

Study of the shielding performances of different materials regarding Electromagnetic Field Interference

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ABSTRACT

This paper presents a computer-aided comparison of some of the most used electromagnetic shielding materials. Computer-aided design (CAD) model and the computer aided engineering (CAE) simulation technologies are used for the analysis of the electromagnetic field shielding performances of each material individually and a comparison will be established. The main topic of this comparison is to establish a proper shielding material for ElectroMagnetic Interference (EMI) sources. A three-dimensional (CAD) model of the circuit breaker coil designed in PTC Creo Elements v.18.1 environment was analyzed in Ansoft Maxwell v.15 environment in order to compute the electromagnetic field distribution. The residual (EMI) values are compared to one another and the best shielding material will be presented for this circumstances.

Fuzzy control strategy for secondary cooling of continuous steel casting

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ABSTRACT

The purpose of this paper is to create an original fuzzy solution on the existing structure of the control system of continuous casting that eliminates fissures in the poured material from the secondary cooling of steel. For this purpose a system was conceived with three fuzzy database decision rules, which by analyzing a series of measurements taken from the process produces adjustments in the rate of flow of the cooling water and the speed of casting and determine the degree of risk of the wire. In the specialized literature on the national plan and the world, there is no intelligent correction in the rate of flow of the cooling water and the speed of casting in the secondary cooling of steel. The database of rules was made using information collected directly from the installation process of continuous casting of the Arcelor Mittal Hunedoara.

Control system of water flow and casting speed in continuous steel casting

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ABSTRACT

This paper presents the results of research based on real data taken from the installation process at Arcelor Mittal Hunedoara. Using Matlab Simulink an intelligent system is made that takes in data from the process and makes real time adjustments in the rate of flow of the cooling water and the speed of casting that eliminates fissures in the poured material from the secondary cooling of steel. Using Matlab Simulink simulation environment allowed for qualitative analysis for various real world situations. Thus, compared to the old method of approach for the problem of cracks forming in the crust of the steel in the continuous casting, this new method, proposed and developed, brings safety and precision in this complex process, thus removing any doubt on the existence or non-existence of cracks and takes the necessary steps to prevent and correct them.

Some considerations about the use of different sensors, in coordinate measuring of the small parts

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ABSTRACT

The paper presents some particular aspects associated with measuring of the smallsize parts with high precision, manufactured by injection procedures. The coordinate measuring machine (CMM) are very used in process of measuring parts with different shapes, dimensions and materials of the most varied. It is studied by experiments, the influence of hygroscopicity on the geometrical properties of polyamide parts, using different types of measuring sensors. We selected a few pieces- cover type, with precision features dimensions and shape tolerances. To measure them was used some sensors which is equipped CMM ScopeCheck S 400 and equipment for dehumidifying. Starting from the need for high precision measurement of geometric characteristics of the parts obtained by injection of plastic, it has been found that the hygroscopicity has a significant influence. To achieve the purpose were used three types of measuring sensors under different conditions of keeping after manufacture. It was observed that the influence of humidity is significantly reduced if the parts are kept in exikator or vacuum dryer.

Arts and technology – Mosaic new techniques and procedures

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ABSTRACT

The relationship between art and technique has been along the time one that is inseparable and systematic, artists appealing to various technologies, tools and practices that help them stimulate their imagination. Today there is a new category of artists, coming from a technical or scientific field, that are being 'trapped' in this „game of art”. The mosaic, even if it is an old technique, responded to the social requirements and it evolved over time, being constantly related to aesthetic and artistic thinking, discoveries of science, assimilating permanent new techniques and technologies, diversifying its artistic forms of expression and methods of transposition. Not being bound any more to a religious institution, which was its birth place, today, she migrated to all public spaces. Works of art in public space have become today an active factor in reshaping the urban aesthetic landscape.

Two fluxes multistage induction coilgun

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ABSTRACT

This paper presents a brand new induction electromagnetic launcher, which uses two magnetic fluxes in order to accelerate a projectile. One magnetic flux induce a current in the armature and the second magnetic flux is creating a radial magnetic field. This aproach offer multiple advantages over single flux designs. First we are able to control the induced current in armature because we use the coil just to induce current inside the ring with a great efficiency. Second advantage is the angle of 90 0 between magnetic field density B and the ring. We used the induction to avoid contact between armature and accelerator. In order to create the magnetic field radial we used four coils perpendicular on armature. This approach alove us to control the phase difference between induced current in armature and current in magnetic field coils for a maximum force. The phase difference is obtained by changing the frequency of magnetic field coils power source. We used simulation software to analyze, and simulate a multistage induction coilgun design with two fluxes. The simulation results demonstrated the theoretical results.

The impact of collaborations between universities and private organizations on cluster development and competitiveness in Romania

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ABSTRACT

While the European Union has put a lot of emphasis on cluster development due to their inherent advantages such as lower transaction costs, technological transfer and regional development, little is known about how clusters emerge and what can facilitate their competitiveness. This paper aims to study the impact of public-private cooperation between universities and organizations on cluster development and competitiveness. A literature review is employed to develop the model while 4 qualitative case studies provide the initial test of its validity. The analysis suggests that cooperating with research institutions impacts cluster development first through education of industrial staff, but also by developing innovation processes through the facilitation of the appearance of innovative ideas and also of knowledge sharing among organizations. The research has several implications both for organizations and for government officials. First of all, R&D and top management should actively seek to cooperate with research institutions both for training of their staff but also in seeking new ideas and as a way of collaborating with other organizations within the field without fear of losing competitive advantage. Second, government officials should try to create more incentives both for organizations (through for example tax returns) and for universities (extra funding or salary incentives) that can increase collaboration between these actors. This paper is the first one to asses empirically how cooperation with research institutions affect cluster competitiveness and development, especially within the developing region of Eastern Europe, Romania.

Simulation of electrical and thermal fields in a multimode microwave oven using software written in C++

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ABSTRACT

Due to multiple reflexions on walls, the electromagnetic field in a multimode microwave oven is difficult to estimate analytically. This paper presents a C++ program that calculates the electromagnetic field in a resonating cavity with an absorbing payload, uses the result to calculate heating in the payload taking its properties into account and then repeats. This results in a simulation of microwave heating, including phenomena like thermal runaway. The program is multithreaded to make use of today's common multiprocessor/multicore computers

Integration of disabled people in an automated work process

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ABSTRACT

Automation processes enter more and more into all areas of life and production. Especially people with disabilities can hardly keep step with this change. In sheltered workshops in Germany people with physical and mental disabilities get help with much dedication, to be integrated into the work processes. This work shows that cooperation between disabled people and industrial robots by means of industrial image processing can successfully result in the production of highly complex products. Here is described how high-pressure hydraulic pumps are assembled by people with disabilities in cooperation with industrial robots in a sheltered workshop. After the assembly process, the pumps are checked for leaks at very high pressures in a completely automated process.

Optical Gripper

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ABSTRACT

With increasing automation, many work processes become more and more complex. Most technical products can no longer be developed and manufactured by a single department. They are often the product of different divisions and require cooperation from different specialist areas. For example, in the Western world, a simple coffee maker is no longer so much in demand. If the buyer has the possibility to choose between a simple coffee maker and a coffee machine with very complex functions, the choice will probably fall to the more complex variant. Technical progress also applies to other technical products, such as grippers and manipulators. In this paper, it is shown how grasping processes can be redefined and developed with interdisciplinary technical approaches. Both conventional and latest developments in mechanical engineering, production technology, mechatronics and sensor technology will be considered.

Automated assembling of single fuel cell units for use in a fuel cell stack

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ABSTRACT

The manufacturing of PEMFC stacks (POLYMER ELEKTROLYT MEMBRAN Fuel Cell) is nowadays still done by hand. Over hundreds of identical single components have to be placed accurate together for the construction of a fuel cell stack. Beside logistic problems, higher total costs and disadvantages in weight the high number of components produce a higher statistic interference because of faulty erection or material defects and summation of manufacturing tolerances. The saving of costs is about 20 – 25 %. Furthermore, the total weight of the fuel cells will be reduced because of a new sealing technology. Overall a one minute cycle time has to be aimed per cell at the manufacturing of these single components. The change of the existing sealing concept to a bonded sealing is one of the important requisites to get an automated manufacturing of single cell units. One of the important steps for an automated gluing process is the checking of the glue application by using of an image processing system. After bonding the single fuel cell the sealing and electrical function can be checked, so that only functional and high qualitative cells can get into further manufacturing processes.

Influence of typical faults over the dynamic behavior of pantograph-catenary contact force in electric rail transport

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ABSTRACT

The quality of electric energy capture and also the equipment operational safety depend essentially of the technical state of the contact line (CL). The present method for determining the technical state of CL based on advance programming is no longer efficient, due to the faults which can occur into the not programmed areas. Therefore, they cannot be remediated. It is expected another management method for the repairing and maintenance of CL based on its real state which must be very well known. In this paper a new method for determining the faults in CL is described. It is based on the analysis of the variation of pantograph-CL contact force in dynamical regime. Using mathematical modelling and also experimental tests, it was established that each type of fault is able to generate 'signatures' into the contact force diagram. The identification of these signatures can be accomplished by an informatics system which will provide the fault location, its type and also in the future, the probable evolution of the CL technical state. The measuring of the contact force is realized in optical manner using a railway inspection trolley which has appropriate equipment. The analysis of the desired parameters can be accomplished in real time by a data acquisition system, based on dedicated software.

Factors that increase the electric field of the dielectric barrier ozone generators

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ABSTRACT

The dielectric barrier discharge cell (DBDC), also called ozone cell, is the main component of the ozone generators widely used. When the cell is powered with a high voltage value (> 5 kV) in the dielectric gas, arises a high intensity electric field that influences ozone generation processes by silent discharge also called dielectric barrier discharge. The intensity of the electric field depends by a number of factors such as the constructive form of the cell, the cell sizes, the value and the waveform of the supply voltage, the type of insulators used as dielectric barrier. The insulators which constituting the dielectric barrier, influence the intensity of the electric field through the dielectric constant of the liquid or solid shows the values of intensity electrical fields from ozone cells, with plane electrodes and ozone cells with cylindrical electrodes. The paper presents a graphic variation of the electric field from the gap and the dielectric barrier of cells with plane electrodes and cylindrical collinear electrodes. Experimental research highlights current-voltage characteristic for several types of dielectrics. Distilled water was highlighted as dielectric with the best results.

Influence of the solid dielectric over the electric field from the ozone cell gap with double dielectric barrier

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ABSTRACT

The distilled water has the advantage of high value dielectric constant (Ɛ = 81) in relation to ceramic glass materials, currently used for constructing the dielectric barrier. It was necessary to build a thin-walled enclosure of solid insulating material that contain distilled water to achieve a dielectric barrier. This was necessary to avoid exposing the liquid to the direct action of ozone. Dielectric permittivity of the solid dielectric material and the thickness of these walls have diminished the value of the electric field form the gaseous gap of the ozone cell compared to the case with the dielectric barrier from distilled water. The author of this work deduced theoretical relationships that express the values of the electric field intensity in the gap of the cell with two dielectrics and compared them with similar relationships of the intensity of the electric field from the gap of the ozone cell with one dielectric. In this work the author presenting experimental results which confirm the theoretical deducting regarding the use of the solid dielectric as enclosure for the liquid dielectric

The current challenges of teaching ESP

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ABSTRACT

Although the status of lingua franca can easily be claimed by English nowadays, there are always plenty of challenges involved in the process of teaching a foreign language. The simple mastering of the four skills (reading, writing, listening and speaking) and the acquisition of general grammar and vocabulary may not be enough in some circumstances. ESP focuses on the specific needs of the learners, concentrating more on language in context and on the students‟ need to acquire a set of professional skills and particular job-related functions. This paper, consequently, focuses on identifying the current challenges that teachers and students may encounter in the process of teaching and learning English for Specific Purposes.

Theoretical aspects of the acceptance of new technologies on the smartphone market

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ABSTRACT

Adoption of new technologies on mobile phone market in the past 30 years has transformed the industry and had a large impact on the global economy. Technological progress, as the main factor in the adoption of new technologies, has enabled reduce costs and increase equipment performance. The smartphone is perceived by consumers as a sustainable element, to which the price sensitivity is less important. Consumers are willing to pay more in exchange for better quality and features of the product. Smartphones have changed the way people communicate with others, find information and manage their daily life. In addition, recent developments of new operating systems, abundant applications and competition between suppliers have facilitated a marked increase of the users' number.

Three lines of defence model and the role of internal audit activities as the response to the global economic crisis

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ABSTRACT

The existing framework of corporate governance has shown a number of weaknesses, and the result was a new economic crisis at the global level. The main problems were identified as: increased risk of investors, non-transparency of information, conflict of interest between corporation subjects. European Institute of Internal Auditors in response to the strengthening the trust in information, shareholders activism, better communication, which all will lead to the reduction of risks and restore investors confidence, proposed the Model Three Lines of Defence, where the key role has internal audit.

Special investigative actions in the criminal procedural law of Bosnia and Herzegovina, and their purposefulness in law

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ABSTRACT

Special investigative actions are a novelty in the criminal procedure legislation BiH. In our legislation this has been introduced only in 2003. These are actions that need to assist prosecutors to effectively reveal the perpetrators and the evidence of serious and complex crimes, especially organized crime. There are criminal offenses in whose execution included a larger number of people in different locations and which are carried out with the help of new communication technologies, so that it is not possible to prove the classic means of evidence (documents, physical evidence, witnesses). Unfortunately, criminals are often better organized than the state and in their criminal activities are introduced various technological developments. Therefore, the legislator extended the powers of the prosecutor and gave them into the hands of more effective mechanisms for discovering the perpetrators of these crimes. Special investigative measures are listed in the Penal Code.

Rational consumption of nutrients at school-aged children

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ABSTRACT

Nutrition lies at the basis of life being a factor of permanent action by which the individual, respectively small or large communities have ensured their survival in relation to the environment. Food represents a natural component which provides the energy and the vitality of the body and helps preserve people's health and welfare. Rational nutrition is closely related to the physical and mental development of the young persons, to the adults' work capacity, to the maintaining, as long as possible, of the elderly's health condition, to the prevention of some acute and /or chronic diseases.

Needs analysis for language course design. A case study for engineering and business students

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ABSTRACT

These days, teaching languages – English in particular – has become an ever more complex and challenging task due to the fact that groups of students are eclectic in terms of knowledge of English and level of competence. Teachers try to adapt to this challenging environment by providing a wide variety of activities and materials so as to satisfy the students' demands. This may sometimes prove counterproductive, is usually time consuming, and requires material and financial resources that are not always available. Under the circumstances, we considered that a needs analysis would benefit all parties involved: teachers on the one hand, in that it would somewhat simplify their effort and make it easier to work with the aforementioned groups of students, and the students on the other hand, in that the activities would be better tailored to suit their needs and requirements in terms of knowledge, abilities and skills. To this end, we conducted a survey in which we requested students to state their level of satisfaction with regard to the English course, as well as provide suggestions in terms of topics and language issues they would like to approach during these courses. In this paper we analysed and interpreted the responses in an attempt to adapt the content of the course so as to better meet the expectations of the end beneficiaries, i.e. the students.

Open source system OpenVPN in a function of Virtual Private Network

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ABSTRACT

Using of Virtual Private Networks (VPN) can establish high security level in network communication. VPN technology enables high security networking using distributed or public network infrastructure. VPN uses different security and managing rules inside networks. It can be set up using different communication channels like Internet or separate ISP communication infrastructure. VPN private network makes security communication channel over public network between two endpoints (computers). OpenVPN is an open source software product under GNU General Public License (GPL) that can be used to establish VPN communication between two computers inside business local network over public communication infrastructure. It uses special security protocols and 256-bit Encryption and it is capable of traversing network address translators (NATs) and firewalls. It allows computers to authenticate each other using a pre-shared secret key, certificates or username and password. This work gives review of VPN technology with a special accent on OpenVPN. This paper will also give comparison and financial benefits of using open source VPN software in business environment.

Considerations on stress triaxiality variation for 2P armor steel

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ABSTRACT

Stress triaxiality is considered an invariant of stress, defined as the ratio of hydrostatic stress (hydrostatic pressure by other authors) and the equivalent stress (usually calculated using von Mises criterion). If the values of the main three stresses have comparable sizes, stress triaxiality can be also calculated using the first invariant of the stress tensor. Despite that the stress triaxiality is an invariant, the authors have determined experimentally and analytically its variation with the force at the tensile test, but also with the radius of notches caused in the specimen. 2P armor steel being used in lightweight armor, these notches occur after shocks with foreign objects. Furthermore, the authors have revealed the stress triaxiality variation function of the test type. The tests were performed on tensile specimens loaded for tensile test, pure torsion test, 25% tensile - 75% torsion test, 50% tensile - 50% torsion test, 75% tensile - 25% torsion test. The mathematical model used was designed by Xue.

Characteristics of the Romanian energy market

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ABSTRACT

This paper highlights the main characteristics of the energy market in Romania. Starting from the mode of organization and operation of the electricity market, there are revealed prices and tariffs for electricity for different categories of customers and their evolution in time. There are pointed also ways of setting electricity prices and tariffs, taking into account the expenditures actually recorded by economic operators.

Research and development regarding the retaining mechanism of lead ions in industrial wastewaters using natural matter with remarkable properties

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ABSTRACT

The paper shows the studying of the retaining mechanism of lead ions in industrial wastewaters through static and dynamic ion exchange mechanisms. In the experimental determinations of the lead metallic ion retention, metallurgical industry wastewaters have been used on samples of volcanic zeolite tuff (from Barsana, Maramures), samples that show a high concentration of lead ions and an acidic pH. The results showed that both the static and the dynamic ion exchanges ended with good results and they were consistent with other studies conducted on clinoptilolite zeolite tuff. Knowing that the industrial sector is an important source of environment pollution and degradation and being aware of what a serious threat the heavy metal pollution is, due to their high toxicity and stability, the experiment may find applicability in different aspects, both in the Maramures mining basing as well as in the worldwide controlling and directing of the polluting processes.

Simulation of defects on contactor coil

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ABSTRACT

By definition, a coil is an electrical passive device, which have two terminals, use in electrical circuits to keep the power in magnetic field or to detect the magnetic fields. In winding process, is possible to appear different defects, or issues which can cause in time problems in functionality of products. In this paper, we will analyze two types of defectives what were observed in winding process. In first type of defect, some wires of beginning of winding remain out of normal winding, and the wires are visible from outside, and in second type of defect, same beginning of winding remain inside of coil, under the normal winding, not in correct position. For simulation, we will used an assembly compose by anchor, electromagnet and coil. Those are parts of contactor.