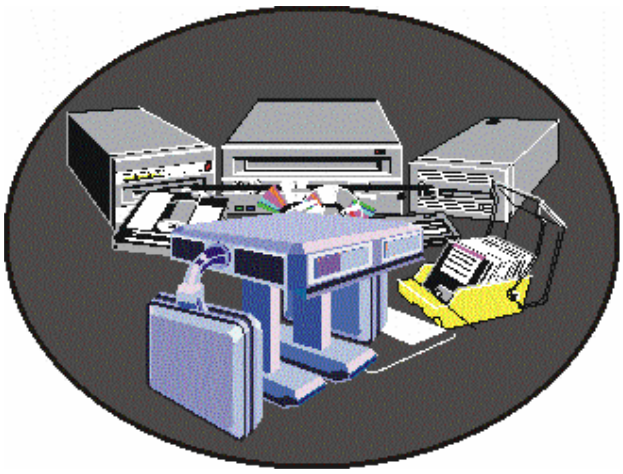
AL XII-LEA SIMPOZION NAŢIONAL DE „MECATRONICĂ ŞI INGINERIE MECANICĂ, MICROTEHNOLOGII ŞI MATERIALE NOI” – MIM-MMN-2014

UNIVERSITATEA “VALAHIA” DIN TÂRGOVIŞTE



FACULTATEA DE INGINERIA MATERIALELOR ŞI MECANICĂ – FIMM

UNIVERSITATEA “VALAHIA” DIN TÂRGOVIŞTE

INCDMTM BUCUREŞTI

MINISTERUL EDUCAŢIEI NAŢIONALE

ACADEMIA OAMENILOR DE STIINTA DIN ROMANIA

27 IUNIE 2014

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PROGRAMUL SIMPOZIONULUI

- **Primirea participantilor va avea loc la Centrul de Conferinte al Universitatii Valahia din Targoviste, la adresa: Str. Mr. I. Alexandrescu, Nr.39 (Corpul K al U.V.T.), incepand cu ora 9 ^{00}.**
- **Primirea participantilor: 9^{30} - 10^{00}**
- **Deschiderea simpozionului: 10^{00} - 10^{30}**
- **Prezentare sofware CAD: 10^{30} - 11^{00}**
- **Lucrari pe sectiuni: 11^{00} - 14^{00}**
- **Pauza de masa: 14^{00} - 15^{00}**
- **Lucrari pe sectiuni: 15^{30} - 18 ^{30}**

Lucrările pe secţiuni vor avea loc în următoarele locaţii:

Sala albastra: Sectiunea Inginerie mecanica, mecatronica, robotica si microrobotica
Sala verde: Sectiunea Materiale noi, microtehnologii, nanotehnologii

SECŢIUNEA

MATERIALE NOI, MICROTEHNOLOGII, NANOTEHNOLOGII

THE ANALYSIS OF EUTECTICAL Al-Si ALLOYS PROPERTIES USED FOR PISTON CAST IN THE INTERNAL COMBUSTION ENGINES

Drd.Mirela POPESCU (DRĂGOIU), Endre FEJÉR, Prof.dr.ing. Bela VARGA
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Abstract. In this study is analyzed the structure and properties of eutectic aluminum alloys for casting pistons for internal combustion engines. Simple thermal analysis and the presence of eutectical pointed silicon confirmed the modified structure of these alloys. The Dilatometer's analysis draws attention to the necessity of applying heat treatment to stabilize the structure. During the piston's operation there are occured significant structural changes that lead to the reduction of mechanical characteristics.

COMPOSITE MATERIALS USED FOR ELECTROMAGNETIC SHIELDING

Ionuţ BĂLAN [1,2], Cristian MORARI [1,2], Eros Alexandru PĂTROI [1]
[1] INCDIE ICPE-CA Bucuresti, [2] Universitatea Politehnica Bucuresti
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Abstract. The use of composite materials is becoming increasingly important in the field of electromagnetic compatibility. The composite materials have been developed in the aerospace industry, in the need to control and improve the properties of the materials in accordance with the requirements set. Nowadays, composite materials are used instead of metallic shields due to their good mechanical properties and corrosion resistance. This paper presents composite materials based on metallic powders and wires, developed for the purpose of the electromagnetic interference protection, and their performance as electromagnetic shields.

PROPERTIES, HOT WORKING AND APPLICATIONS OF Cu-Ag ALLOYS OBTAINED BY CASTING AND POWDER METALLURGY

Conf.dr.ing. Mircea DOBRESCU , S.l.dr.ing. Marius VASILESCU
Universitatea Politehnica Bucuresti
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Abstract. In the paper we present in comparison hardness and electrical conductivity of copper cast ingot (I/M) and sintered copper (P/M) with Cu-Ag5 alloys (I/M and P/M) subjected to the same treatment.

CONSIDERATION ON SOME SHAPE MEMORY ALLOYS FROM CU-ZN-AL AND NI-TI SYSTEMS AND THEIR APPLICATIONS

S.l.dr.ing. Marius VASILESCU, Conf.dr.ing. Mircea DOBRESCU
Universitatea Politehnica Bucuresti
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Abstract. In the paper are shown some wide hysteresis shape memory alloys from Cu-Zn-Al system and Ni-Ti based alloys and their applications starting from increasing the hysteresis of the alloys or more precisely by separating austenite start temperature (As) from martensite start temperature (Ms) as far as it is possible.

INTERPHASE PHENOMENA IN THE INTERACTION BETWEEN LIQUID STEEL AND REFRACTORY LINING IN DEVELOPING SPECIAL STEELS

Conf.dr.ing. Vasile BRATU, S.l.dr.ing. Violeta ANGHELINA, S.l.dr.ing. Nicoleta POPESCU,
As.dr.ing. Elena STOIAN, S.l.dr.ing. Dan UNGUREANU
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Abstract. The main objective of the paper is to highlight the role of interphase interaction phenomena between the liquid steel and the refractory lining and between phases melted and fused refractories refractory.

BRINELL TEST. AN APPROACH WITH STOCHASTIC PROCESSES

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Abstract. This work presents an evaluation model of the Brinell hardness test, with an approach a Stochastic processes. Hardness evaluation is one of the most important and commonly used methods

for material or product testing.In this case we built a characteristic stochastic process with discreet times and for that one we made some calculation using real data observed in laboratory tests.It may be that these results can improve the financial and economic evaluations to reduce cost expenses.

WORKABILITY AND RHEOLOGICAL PROPERTIES OF SPECIAL PORTLAND CEMENT BINDERS

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Abstract. This article presents a study of cementitious systems at workability and rheological tests . It should be mentioned that workability tests have been performed on self - compacting concrete mixture s (SCC) and rheological tests were carried out on portland cement pastes similar in terms of binder composition , with that of self-compacting concrete compositions.

MECHANICAL CHARACTERIZATION OF HIGH ALUMINA ADDITIVATED CEMENT

Prof.dr.ing. Nicolae ANGELESCU [1], Dr.Ing. Cristina STANCU [2],
Conf.dr.ing. Vasile BRATU [1]
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Abstract. This paper aims to present the structural and mechanical behaviour of high alumina additivated cement based on high mineralogical refractory compounds such as dicalcium monoaluminate and monocalcium hexa aluminate in comparison with the usual high alumina cement, at normal temperature and after treatment at high temperature heat, too.

INFLUENCE OF POLYMERIC ADDITIVES ON THE PROPERTIES OF POLYMER CONCRETE

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Abstract: The admixtures have favorable influences on the properties of polymer concrete in both fresh and hardened state. The polymer concrete have superior mechanical strength and better behavior to corrosive attack compared to concrete without polymer. Also, their permeability is low and workability time is higher. In this paper, experimental investigations were made to determine the influence of the type of polymer on cement hydration and rheology of fresh cement pastes. To follow the evolution in time of these properties were used modern methods of investigation. Special attention was given to the study on mechanical strengths of concrete with polymers that were considered in terms of high performance concrete.

DIAGNOZA ENERGO-ECOLOGICA IN MODERNIZAREA INSTALATIILOR DE CAZANE SI DE CUPTOARE

Prof.dr.ing. Aurel GABA
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Abstract. Diagnoza energo-ecologica consta in analiza functionarii, in conditii actuale si de dupa modernizare, a instalatiilor de cazane si de cuptoare, pe baza de bilant energetic si de emisii de poluanti in variante reale si optimizate, in care parametrii de dupa modernizare sunt determinati prin simularea functionarii cu ajutorul unor programe de calculator adecvate. Lucrarea descrie algoritmul programului de diagnoza energo-ecologica si aplicarea sa in modernizarea unui cuptor de incalzire.

DATA SCATTERING IN TENSILE STRENGTH MEASUREMENT OF METALS AND GLASS EPOXY COMPOSITE

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Abstract. Fragile materials (glasses and ceramics) exhibits characteristics extremely sensitive to the presence of minute flaws. The strength of ceramics and glasses depends upon the size and distribution of flaws. Data analysis were performed by using Weibull distribution. The tensile tests on glass epoxy composites emphasis a higher experimental data scattering, due to ceramic phase behavior, then experimental data scattering in case of steels.

EXPERIMENTAL RESEARCH AND COMPACTION BEHAVIOUR MODELLING OF MATERIALS COMPOSITE WITH POLYMERIC MATRIX

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Abstract. The aim of the present paper were to determine compressibility behaviour of post-compacts depending on compaction pressure for the materials obtained in laboratory that contain metallized netting like reinforcement material and powdery nanocarbon as filling agent . Determination of polymeric composite on basis of silicone rubber with additions like nanocarbon with 20 wt.% nanocarbon, powder mixtures' compressibility was performed in mechanical testing machine for static materials, LFM model, Walter & Sai AG Switzerland at pressures 30kN. Determining the characteristics of material was based on the regression analysis . Modulus of elasticity of the test samples was determined appropriate range 0,1 ÷ 0,3% deformation, corresponding to the maximum correlation coefficient derived from regression of the experimental data. The synthetic polymeric matrix used at the obtaining composite films is represented by a bicomponent silicone elastomer that strengthens itself at the room temperature by means of a poly

condensation reaction. The paper shows up the research results on processing and characterization of composite materials with polymeric matrix (silicone rubber).

INFLUENTA ANUMITOR PARAMETRII ASUPRA PIERDERILOR MAGNETICE ÎN BENZILE SILICIOASE CU GRAUNTI NEORIENTATI

As.dr.ing. Elena Valentina STOIAN, Doru PÎRVU
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Abstract. Scopul lucrarii este de a determina caracteristicile magnetice ale benzilor silicioase cu graunti neorientati, întrucât piederile magnetice din otelurile silicoase trebuie sa prezinte valori scazute. Studiu s-a realizat pe un lot de 10 rulouri destinate a se prelucra în vederea obtinerii otelului electrotehnic de calitate M330-50A si M400-50A (conform EN 100027-1) si anume din lotul I, adica 5 tipuri de rulouri care au suferit o tehnologie de laminare clasica (laminare pâna la grosimea finala urmata de tratament termic de recristalizare si decarburarea) si lotul II pentru care a fost aplicata o tehnologie de fabricatie cu doua laminari si tratament termic intermediar . Caracteristicile magnetice au fost determinate cu ajutorul cadrului Epstein conform IEC 60404-2.

SPECTRAL AND PHOTODYNAMIC PROPERTIES OF SILICON (TERT-BUTYL) PHTHALOCYANINE

Drd. Ana-Alexandra SORESCU [1] , Prof.dr.ing. Rodica-Mariana ION [1,2] , Dr. chim. Alexandrina NUŢĂ [1]
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Abstract. Phthalocyanine derivatives are of increasing technologicalrelevance due to their unique photophysical properties.These compounds have proven great potential as materials for optoelectric and medical devices in medicine. Though silicon phthalocyanines bearing a different number of fused benzo-moieties are spectroscopically well investigatedin solution, a complete spectroscopic characterizationof their properties is not available, yet. To learn moreabout the influence of the silicon-metal in the benzo-annelated extended pi-system, we systematicallyinvestigated the spectroscopic and photodynamic properties of this new phthalocyanine. Since the centre of the phthalocyanine ligandis coordinated with silicon central metal ion, the electronicstates are of both silicon and ligand origin. As aconsequence the monomers of these compounds have a good absorbance and fluorescence than theirmetal-centered compounds. In addition, to mimic strong interaction betweenmolecules, we investigated dimers/aggregates of the compound. Also, the photodynamic properties wereinvestigated. ***Acknowledgement:*** This paperreceived the financial support of the project: PN 09. 09. 04. 12. 05

PHOTOVOLTAIC CONVERSION OF SOLAR ENERGY

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Abstract. Because of the increasing demands in clean energy, the solar energy industry is one of the fastest growing forces in the market. Nowadays there are several major directions for solar technology development. For example, photovoltaic systems directly convert the solar energy into electrical energy, while concentrated solar power systems first convert the solar energy into thermal energy and then further convert it into electrical energy through a thermal engine. In order to choose the right solar system for a specific geographic location, understanding and comparing the basic mechanisms and general operation functions of several solar technologies that are widely studied. This paper is a comprehensive analysis of some eloquent examples of photovoltaic conversion of solar energy, production of s olar thermoelectricity and concentrated solar power systems .

STUDY REGARDING THE GROWTH OF DUST COLLECTION FROM C.A.E AND EQUIPMENT FOR REDUCING THE PERCENTAGE OF POWDER PARTICLES

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Abstract. One of the main problem in developing steel and ferro-alloys in CAE, is the issue of the environment. In this respect, efforts have been made to optimize suspension collecting in the exhaust, so in order to improve working conditions and to meet emissions limits imposed by environmental legislation . This paper shows correlations between constructive, functional and technology factors of EAF - CAE in order to optimize the energetic and technological greening of the oven.

ANALIZA ELEMENTELOR MINORE ÎN OTELURI PRIN METODA ANALIZEI PRIN ACTIVARE CU NEUTRONI

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Abstract. Lucrarea de fata se ocupa cu analiza prin activare cu neutroni a trei probe din otel tip AISI 316 L considerate apriori ca fiind biocompatibile. Analiza prin (radio) activare este o metoda de investigare elementara (determina concentratia sau cantitatea unui anumit element într-un esantion), bazata pe masurarea proprietatilor radioactive induse in proba (radioactivitatea : în general radiatiei ? însotita de activitatea ß indusa, acestei radiatii putându-i-se masura energia maxima), ale unor radioizotopi produsi în substanta studiata prin intermediul reactiilor nucleare.Proprietatea neutronilor de a interactiona aproape cu orice nucleu a condus la o larga utilizare a lor în scopul analizelor structurale ale substantelor. Astfel, in aceasta lucrare s-a urmarit sa se extinda numarul elementelor

dozate din aliajele AISI 316L cat mai mult, utilizand metodele atomice si nucleare conventionale disponibile. Programul analitic al tehnicii spectrometrice de emisie optica prin arc si scanteie electrica (SEOASE), implementat cu echipamentul Foundry-Master poate doza marea majoritate a elementelor prezente in probele din otel AISI 316 L. Conform literaturii de specialitate si a specificatiilor procedurilor IFIN-HH prin tehnica AAN (analiza prin activare cu neutroni) se pot doza elementele commune programului analitic al tehnicii SOEASE, dar si elemente suplimentare . Tehnica AAN poate doza in plus fata de tehnica SEOASE elementele Sc, Se, La, Sm si Pb. Pe de alta parte, SEOASE poate doza elemente pe care tehnica AAN nu la poate doza precum: B, C, Na, P, S, Ti,Co si Mo.Din acest motiv, materiale ca otelurile de tip 316 L au fost alese pentru testarea performantelor metodelor analitice, cat si pentru a estima ceea ce poate aduce in plus o metoda analitica nucleara avansata precum metoda AAN.

MODELAREA SI CONTROLUL UNUI MICROMANIPULATOR ACTIONAT ELECTROMAGNETIC

As.drd. ing. Veronica DESPA, S.l.dr.ing. Adrian CATANGIU, Conf.dr.ing. Ioan Alexandru IVAN, Ddrd.ing. Valentin GURGU, S.l.dr.ing. Mihai ARDELEANU
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Abstract. Un microgripper cu doua brate ce pot fi asimilate unor grinzi încastrate este actionat prin încovoierea acestora, astfel încât la capatul efector se realizeaza strângerea obiectului de manipulat. Aplicarea fortei de strângere pentru fiecare brat se realizeaza prin interactiunea electromagnetica dintre un solenoid fixat rigid pe carcasa microgripper-ului si un magnet permanent fixat pe brat. Modelarea efectului interactiunii solenoid-magnet si magnet-magnet asupra miscarii bratelor a condus la rezultate foarte apropiate de modelul experimental testat.

METODE DE ACOPERIRE SI CONTROL ALE SUPRAFEŢELOR COMPONENTELOR PROTETICE DE ŞOLD

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Rezumat: Utilizarea protezelor de şold întampină probleme generate de fracturarea şi decimentarea, reacţiile fiziologice de respingere ale organismului şi cea mai importantă – uzarea materialului, ceea ce impune îmbunătăţirea performanţelor tribologice prin modificări constructive şi chiar a principiului de funcţionare. Reducerea uzurii se poate realiza prin creşterea durabilităţii materialelor din care sunt realizate componentele protetice, o chimie a suprafeţei diferită care să reducă frecarea adezivă precum si acoreprirea componentelor prin tehnologia straturilor subţiri. Lucrarea prezintă studii morfologice ale straturilor de nanoparticule depuse pe suprafata protezelor de sold, prin microscopie SEM si AFM.

MAGNETIC RUBBER BASED ON NANOCRYSTALLINE MAGNETITE PARTICLES

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Abstract: A method for obtaining magnetic rubbery silicone without using halogen-containing materials is presented, and its physical and mechanical properties are discussed. Synthesis of magnetic silicone rubber, based on highly nanocrystalline magnetite, under uniform magnetic field was used to prepare anisotropic samples. The controlled magnetic field orients the magnetite nanoparticles and a chain structure develops. This nanocomposite material becomes anisotropic in terms of magnetic and mechanical properties. One can easily vary the direction of the particle chains by the direction of the applied magnetic field. In addition, the tensile strain of the material in relation to normal stress changes due to the existence of the magnetite nanoparticles is studied. The spatial distribution of the magnetite nanoparticles has a decisive effect on the stress-strain curve as well as on the swelling kinetics. Due to their shape and size distortion ability in a magnetic field, these magnetic stimuli-responsive materials have interest in artificial muscles, actuators, and micromanipulators.

ÉTUDE COMPARATIVE DE L'EFFET SUR LE MODULE D'ELASTICITE D'UN COMPOSITE VERRE-EPOXYDE UNIDIRECTIONEL INDUIT PAR EXPOSITION A UN MILIEU AQUEUX ET PAR FATIGUE MECANIQUE

Cyril FERNANDEZ[1], S.l.dr.ing. Adrian CATANGIU[2]
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Abstract. Le vieillissement d'un matériau exposé à un milieu quelconque peu prendre plusieurs aspects. Ceux-ci ont une conséquence globale sur l'évolution de ses propriétés mécaniques. La quantification individuelle de chaque effet permet de mettre en évidence le facteur de dégradation prépondérant du milieu. Cette étude vous propose une corrélation entre l'influence de l'exposition à un milieu aqueux et le cyclage mécanique en flexion sur le module d'élasticité d'un composite verre-époxyde unidirectionel.

STUDIES AND RESEARCHES CONCERNING THE UNCERTAINTY MEASUREMENT ESTIMATION OF SUB-GRAIN SIZE ON MONO AND POLYCRISTALIN STEEL STRUCTURES

Drd.Ing. Adrian BIBIŞ, Conf.dr.ing. Mihai BRÂNZEI,
Conf.dr.ing. Ion PENCEA, Prof.dr.ing. Ion CIUCĂ
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Abstract. X-ray diffraction is a well-known method used to investigation the mono and polycrystalline structures. Polycrystalline metallic materials have a long distance atomic order structure at the sub-grain level, which are infect real crystallites. This is the main reason that X-ray diffraction technique is very used to study the distortion crystal lattice. The estimation of average

apparent scale is important to underlie the mechanical and electrical properties of metallic materials. Thus, this estimation allow to estimate the density of dislocation and subsequent the material physical properties variation. Authors present in the paper the uncertainty measurement estimation in according with SR EN 98-3:2010 standard and propagation of errors rule. There were considered two types of quenched steels: 316L stainless steel and 100Cr5 bearing steel. The reference material was ARMCO Pure Iron (min. 99.85% Fe).

STUDIES AND RESEARCH FOR DETERMINATION OF RETAINED AUSTENITE

Dr.ing. I. CRISTEA, Conf.dr.ing. Mihai BRANZEI,
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Abstract. This paper has as fundamental purpose the theoretic and practical presentation and explanation of the way to determine the retained austenite content. Is presented the chosen experimental method and technique – the estimation method of the residual austenite content using the DRON 3 diffractometer. The used procedure: after processing and indexing the difractogrames was determined the residual austenite content following the pairs of iron lines: a (110) and ? (111) and a (211) and ? (311), reaching the conclusion that the samples investigated by X-ray diffraction contain residual austenite between 2,8 % minimum calculated value and 4,9% maximum calculated value.

ANALIZA TERMICA A UNOR COMPUSI FOSFOCALCICI DE TIPUL HIDROXIAPATITEI

S.l.dr.ing. Dan UNGUREANU, S.l.dr.ing. Adrian CATANGIU,
Conf.dr.ing. Vasile BRATU, S.l.dr.ing. Nicoleta POPESCU
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Abstract. In acesta lucrare sunt prezentate rezultatele analizei termice in cazul unor pulberi fosfocalcice de tipul hidroxiapatiei, sintetizate prin metoda de coprecipitare chimica. De asemenea, s-a realizat o analiza comparativa a rezulatelor obtinute pe probele sintetizate cu cele ale unei hidroxiapatite comerciale.

RESEARCHES AND STATISTICAL ANALYSIS OF THE STEEL PIPE CORROSION BEHAVIOR USED TO TRANSPORT PETROLEUM PRODUCTS

S.l.dr.ing. Nicoleta POPESCU , S.l.dr.chim. Maria-Crisiana ENESCU, Conf.dr.ing. Vasile BRATU,
S.l. dr.ing.Dan Nicole UNGUREANU, S.l. dr.fiz. Florina Violeta ANGHELINA
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Abstract. When transporting petroleum products we using underground pipes made of steel pipes OLT 35, OLT 45 and OLT65, in accordance with the Romanian standards. A problem that appears to operate these tubes is their corrosion, and as a result, in this work were determined corrosion rate,

(ii) minimum potential cathodic protection of steel and (iii) the corrosion potential of steel in given conditions to the saturated calomel electrode (ECS). It also determined the statistical analysis of the experimental data obtained .

INFLUENTA CANTITATII DE PARTICULE ANORGANICE IN MATERIALELE COMPOZITE CU MATRICE POLIMERICA

S.l.dr.chim. Maria Cristiana ENESCU, As.dr.ing. Elena Valentina STOIAN,
S.l.dr.ing. Ileana Nicoleta POPESCU
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Abstract. Studiul prezinta aproximari simplificate ce permit evaluarea modulului longitudinal si transversal unidirectional al unui material compozit, pornind de la proprietatile elastice ale constituentilor (particule anorganice, matrice) precum si proprietatile lui relative. In calcule, raspunsul materialului compozit est asimilat cu un sistem asociat de particule si matrice.

STUDII PRIVIND OBTINEREA CELULELOR SOLARE UTILIZAND SILICIU MONOCRISTALIN

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Abstract. Dezvoltarea sectorului materialelor semiconductoare şi dispozitivelor electronice constituie un impact puternic asupra domeniului energiilor regenerabile, în strânsă legătură cu protejarea mediului înconjurător. Utilizarea siliciului monocristalin în industria celulelor solare este indicat datorită conversiei eficiente a acestui material în strânsă legătură cu folosirea unor linii tehnologice de ultimă generaţie pentru reducerea costurilor de fabricaţie În fabricarea celulelor solare pe bază de siliciu trebuie să se aibă în vedere importanţa proceselor fizice care au loc la nivelul interfeţei metal-semiconductor. Creşterea randamentului celulelor solare pe bază de siliciu trebuie are la bază şi reducerea pierderilor energetice, în special cele datorate reflexiei radiaţiei incidente, vitezei mari de recombinare superficială a valorii rezistenţei serie şi a valorilor mici pentru lungimile de difuzie. Selectarea materialelor ideale de fabricaţie în funcţie de proprietăţile specific fiecărei aplicaţii constituie este aspectul cel mai important pentru industria microelectronică un domeniu în continuare cu perspective de viitor. Folosirea siliciului dopat, ca material de bază în fabricarea celulelor solare se datorează faptului că acesta are un coeficient de absorbţie bun. În ceea ce priveşte faza de proiectare a celulelor solare pe bază de siliciu este necesar să se aibă în vedere dependenţa mărimilor ce influenţează concentraţia de dopare (coeficient de difuzie, timp de viaţă,lărgimea benzii energetice interzisă). O analiză precisă asupra acestui subiect se poate realiza prin simularea datelor cu ajutorul softurilor dedicate şi a computerului.

PLATINUM METALS IN HIGH TECHNOLOGY DEPARTMENTS

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Abstract. Noble metals (Au , Ag) and platinic metals (Pt, Pd, Rh, Ru, Ir, Os) belong to the transition metals group and have an incomplete d sub-shell. These metals have exquisite qualities (corrosion resistance properties, specific surface properties, stable electric properties) that are found to be in the performance and their reliability. Osmium, rhodium, iridium, ruthenium have been introduced in the industry in the last decades beside gold, silver, platinum, palladium like basis constituents of some new materials. The main consumers are the producer industry of measuring and laboratory instruments, the chemical and petrochemical industry, electronic industry. However, the use possibilities of precious metals are far away to reach the maximum limit, the research done to increase the applications number being on the basis of deep study of pure metals, alloys and their compounds properties. Platinic metals are metals of group VIII of the periodic table beside the metals from sub – group of iron.

SECŢIUNEA

INGINERIE MECANICĂ, MECATRONICĂ, ROBOTICĂ ŞI MICROROBOTICĂ

THEORETICAL AND EXPERIMENTAL STUDY REGARDING THE GAS FLOW THROUGH NOZZLES APPARATUS FOR OXY-FUEL CUTTING

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Abstract. The paper analyze the theoretical performance of the manual instrument makers who depend cutting oxygen and acetylene are submitted and verified test bench for original proposals on improving performance.

MODEL DE UZARE A SUPRAFETELOR PLANE CU MISCARE DE ALUNECARE UTILIZATE ÎN CONSTRUCTIA DE MASINI

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Abstract. Uzarea se defineste ca un proces de distrugere a stratului superficial a unei cuple, într-un volum mic de material, având ca efect aparitia particulei de uzura. Mecanismul formarii particulelor de uzura depinde în mare masura de starea de deformatie din zona de contact (elastica, plastica,elasto-plastica), de natura materialului (tensiunea de rupere, curgere etc.) si de conditiile de lucru (presiune, viteza, temperatura etc.).Materialul cu duritate mai mare, în functie de tensiunea maxima aparuta pe suprafata de frecare, de unghiul si geometria rugozitatilor (sau particulelor abrazive), se poate deforma elastic sau plastic, modificând starea suprafetei conjugate. Lucrarea propune analiza modului de raspuns a materialelor unei cuple de frecare cu miscare de alunecare, la care duritatile materialelor sunt diferite, si întocmirea unor harti în vederea stabilirii modului de comportare la frecare si uzare a unei cuple, functie de parametrii sus mentionati, putându-se ocoli conditiile de prelucrare, încarcare si lubrifiere care pot dauna bunei functionari a unei cuple.

UNFOLDINGS OF THE CYLINDRICAL SURFACES USED IN THE INDUSTRIAL INSTALLATIONS

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Abstract. The connections in the construction of the various industrial installations: pipes, boilers, joints elements and fittings have a cylindrical configuration, or similar cylindrical shape. The execution and their installation require knowledge of the unfolding and intersection curves, which compose them. The graphical solving of the problems of technical representation has enabled the formation of abstract geometric of the pieces forms and the ability to see into space. The paper proposes to establish the unfolding of a connection, used in the industrial equipments, by the classical method of the descriptive geometry and mathematics, using appropriate software.

DETERMINATION METHODS OF THE INTERSECTION CURVE BETWEEN A CYLINDER AND A TRUNK OF PYRAMID

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Abstract. This paper, based on the descriptive and analytical geometry, shows the trace elements of the unfoldings various intersections of geometric corps, the mathematical relations of calculation, necessary to determine some characteristic points.
The paper presents some considerations on the theory of unfolding a pyramidal surface and a cylinder solved using the descriptive geometry and mathematical approach of the problem. As an application, a trunk of pyramid and a cylinder of a given diameter there is.

ECONOMIC EFFICIENCY OF THE TOTAL COST OF OBTAINING THE PRODUCTION BY MODIFYING SOME CHARACTERISTICS OF THE INITIAL PREFORM (1)

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Abstract. This paper presents a real situation in which a manufacturer of parts used in the car industry has tried to honor an order coming from a customer by optimizing the total cost of producing output. Based on the analyzes performed on the two categories of cost components, it can be concluded that just obtain a reduction from the total cost of raw material optimization.

ECONOMIC EFFICIENCY OF THE TOTAL COST OF OBTAINING THE PRODUCTION BY MODIFYING SOME CHARACTERISTICS OF THE INITIAL PREFORM (2)

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Abstract. In the second part of the paper will present the effect of changing a characteristic of the initial work piece on the total cost of the production and thus obtaining the economic efficiency of the process. For obtaining optimized version of work piece studies, the final length of the work piece perform allows use without affecting its final destination at the same time, but will et reduction in the mass of raw material used and ultimately a reduction in total cost of raw material, which will be reflected in lowering the total cost of obtaining the production of parts.

STUDIUL DINAMIC AL UNUI SOLID RIGID IN MISCARE PLAN-PARALELA SUPUS LA LEGATURI

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Abstract. Lucrarea îsi propune sa prezinte o metoda numerica utilizata pentru studiul dinamic (miscarea sub actiunea fortelor) al unui solid rigid aflat în miscare plan-paralela care are un punct obligat sa se miste pe un cerc de raza R. Se vor scrie mai întâi ecuatiile de miscare ale solidului rigid considerat liber, apoi se vor scrie aceleasi ecuatii în prezenta fortelor de legatura considerate necunoscute. Necunoscutele (fortele de legatura) vor fi apoi eliminate din sistemul de ecuatii diferentiale. Se obtine un sistem de ecuatii diferentiale de ordinul întâi care vor fi integrate utilizând metode numerice de integrare.

ANALIZA DINAMICA A MISCARILOR ELASTICE SUPRAPUSE MISCARILOR DE RIGID

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Abstract. În lucrare este prezentata o metoda numerica de analiza dinamica a miscarii relative (elastice) a unui solid rigid care culiseaza în interiorul altui solid rigid aflat în miscare de rotatie. Se urmareste determinarea miscarii celor doua solide rigide sub actiunea fortelor.

PROIECTAREA UNUI STAND EXPERIMENTAL PENTRU TESTAREA CUPLEI DE FRECARE A CAPULUI FEMURAL AL UNEI PROTEZE DE SOLD

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Abstract. Cunoasterea fortelor care actioneaza asupra articulatiei soldului este necesar a pentru efectuarea de teste la oboseala a implanturilor în conditii fiziologice de încarcare. O masina de testare la uzare, în masura sa testeze protezele reale, este numita simulator de sold. De-a lungul timpului, s-au realizat cercetari pe diferite tipuri de simulatoare si diferite tipuri de implanturi. Obiectivul lucrarii este de a prezenta câteva variante de simulatoare de sold si o varianta de stand experimental în conceptie proprie, pentru testarea cuplei de frecare a capului femural al unei proteze de sold, pe care sa poata fi simulate miscarile principale ce se produc în articulatia soldului si anume: miscarea de flexie-extensie, miscarea de rotatie interna - rotatie externa, miscarea de microseparare.

TORSIONAL VIBRATION STUDY AT THE START UNDER LOAD WITH A CONSTANT TORQUE FOR ONE INDUSTRIAL EQUIPMENT

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Abstract. The dynamic stresses occur in shaft coupling between motor and equipment due to dynamic loading (inertial shock or accidental) and overlapping operating stresses corresponding to normal operation. These tensions have values that exceed the allowable values. Because of this dynamic loads are taken into account by an overload coefficient ks. At constant torque load start occurring dynamic torsional vibration and dynamic torsional couples Mtd respectively important dynamic shear stress , enough to be taken into account. This paper presents the calculation of dynamic couples torsioanale and influence mass parameters (inertia), the torsional stiffness of the shaft and the report torque / torque-resistant on dynamic parameters defined at the start of equipment with constant torque.

TORSIONAL VIBRATION STUDY AT THE START UNDER LOAD WITH A CONSTANT OR VARIABLE TORQUE FOR ONE INDUSTRIAL EQUIPMENT(II)

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Abstract. At load start occurring dynamic torsional vibration and dynamic torsional couples M td respectively important dynamic shear stress , enough to be taken into account. This paper shows how the dynamic loading at the start of a echipamet load with variable torque shaft are produced torsional deformations using the general solutions obtained by integration and also the modeling and simulation software MATLAB-SIMULINK.

THE INTEGRATION OF THE COMMUNICATION WITHIN MECHATRONIC SYSTEMS

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Abstract. Communication between the various mechatronic systems is a way to transmit information from one device to another through standardized communication protocols. Standardized communication has enabled the development of mechatronic systems in various fields in the area of the quality control by interconnecting various equipment in the complex architectures dimensional control and measurement for different parts. Was made various mechatronic systems having architectures that combine various elements necessary for the control and measurement of the dimensions parts.

RAPID PROTOTYPING USING SELECTIVE LASER SINTERING FOR HUMAN SKELETON TAILORED IMPLANTS

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Abstract. Bone reconstruction can be customized for every patient with minimum effort and in safety because of the great possibility of computing CT files of DICOM type and transforming data in STL and CAD files that can be visualized and manipulated in 3D. As a plus, the strains and stresses could be simulated through FEM/CFD (Finite Element Analysis/Computer Fluid Dynamics). Thus, the surgeon and the engineer have a real time image of the future implant even before implantation and they can do some vital individualised adjustments to improve it. Building time for a standard implant could be between 2-10 hours, so every geometric shape, even with a very high degree of complexity could be delivered next day after design confirmation. Then, the implant could be mechanically tested, both static and dinamic, and after results, the mechanical properties of the implant can be improved by the manipulation of laser exposure.

EXPERIMENTAL RESEARCH ON THE INFLUENCE OF CUTTING PARAMETERS ON ROUGHNESS OF TURNED SURFACES

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Abstract. Some results of the investigation of factors influencing the roughness of turned surfaces are presented In the paper. The main parameters affecting the surface roughness of machined sourfaces are: cutting speed, feed and axial depth of cut. By choosing different cutting regimes in finishing turning on a CNC lathe, it was investigated the variation of the surfaces roughness.

RESEARCHES ON THE 3D INTEGRATED CONTROL OF COMPLEX COMPONENTS FROM AUTOMOTIVE INDUSTRY BY LASER SCANNING

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Abstract. The creactivity of human being correlated with the requirements of permanent increase of the living standard, constitutes the basis of society development. In a perfect world or in an integrant production environment, the 3D measurement systems, by providing the quality control integrated in the production line would be able to measure all the necessary parameters in a single step, without errors and render the results in the same way to the manufacturing networks with computers, in formats useful for CNC machines control and processes management. Progressive replacement of traditional tools with intelligent technological equipment becoming more complex is one of the most important aspects of the development of production processes in all industrial fields. Because the automotive industry is one of the most important industries in the world, manufacturing systems engineering, control methods and techniques, and assurance of quality, present particular interest by the economic results, in particular the reduction of working time and production costs. Intelligent measurement and integrated dimensional control are needed to ensure the quality of the product or industrial manufacturing process, whatever the field.

DESIGN AND CONTRUCTION OF A MECHATRONIC SYSTEM WITH PHOTOELECTRIC INCREMENTAL TRANSDUCER FOR HIGH PRECISION MINI-DIMENSIONAL MEASUREMENTS

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Abstract. This paper presents the design and construction of a mechatronic system with high precision photoelectric incremental sensor for mini-dimensional measuring, system that underlies the construction of mechatronic and adaptronics equipments used for high precision measurement of linear movements

CERCETĂRII PRIVIND INTERDISCIPLINITATEA PROGRAMULUI DE STUDII MECATRONICĂ, ÎN ÎNVĂŢĂMÂNTUL PREUNIVERSITAR

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Abstract. Lucrarea prezintă viziunea sistemică a interdiscipinalităţii, limbaj matematic, dificultăţi umane în abordearea interdisciplinarităţii pentru programul de studii Mecatronică, aplicat în învăţământul preuniversitar în vederea pregătirii complexe şi complete ale elevilor de liceu care se pregătesc pentru învăţământul superior.

MECANISM CARDANIC CU TRANSMITEREA MIŞCĂRII SUB UN UNGHI DE 90º. MODELARE VIRTUALĂ, STUDIUL MOBILITĂŢII ŞI AL CINEMATICII

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Abstract. Lucrarea conţine o descriere a mecanismului studiat, părţi componente, soluţie constructivă, modelarea virtuală a acesteia. Studiul mobilităţii mecanismului pentru transmiterea mişcării sub un unghi de 90^0 se axează pe caracteristica lanţului cinematic al mecanismului, pe analiza cuplelor de mişcare dintre elemente. Cinematica mecansimului, în comparaţie cu rezultatele obţinute prin simularea mobilităţii virtuale, este studiată pentru diferiţi parametrii ai mişcării cum ar fi deplasările rezultate la elementul de ieşire din mecanism.

MEASUREMENT POSITIONS SYSTEM BASED ON IMAGING INFORMATIONAL CODIFICATION OF ABSOLUTE POSITION

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Abstract. In positioning measurement techniques are a lot of diverse methods at macro and micro scales for extracting coordinates. The image processing represents in actuality a large field of innovative new systems. The actual positioning systems included into automation equipments are based on a series of transducers that are connected directly to execution elements of mechanisms. The present idea refers to a bi-dimensional working space that need by two coordinates for positioning determination. The planar space becomes an informational support that is video interpreted by a special image processing system and this system connects the absolute coordinates of an absolute origin to all objects existing into visual field trough informational entities similar with milestone. In this paperwork the authors present the principle and some results obtained into experimental system functioning.

MODELING OF RESISTANT FORCES FOR A INSPECTION MINI-ROBOT IN A TILTED LAND AND ON A CURVEDMOTION

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Abstract. In this paper there are presented two constructive aspects of a novel tracked mini caterpillar autonomous robot for patrol and inspection. There are analyzed the resistant forces that appear when the robot navigates on a tilt plane and also the resistant forces on each track when the robot is performing a curbed motion.