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**CONFERENCE PROCEEDINGS OF "TEHNONAV 2002"**

**ASPECTE GEOMETRICE ALE ANGRENAJULUI PIULIȚĂ/CREMALIERĂ –  
SECTOR DINȚAT DIN CASETA DE DIRECȚIE CU RAPORTUL DE  
TRANSMITERE VARIABIL**

ALEXANDRU P., CEAUȘESCU B., DIACONESCU D., *Transilvania University of Brasov,  
Brasov, Romania*

**Abstract.** The paper presents solution to obtain variable transmission ratio in car steering boxes. The possibility to obtain function of the transmission ratios for mechanism the curved rack/eccentrically pointed segment, respectively, in the rack variable pitch.

**MODELAREA ȘI SIMULAREA MIȘCĂRII DE RULIU A AUTOVEHICULELOR**

ANDREICA G., ALEXANDRU P., *Transilvania University of Brasov, Brasov, Romania*

**Abstract.** The roll motion of the car body is one of the great importances in transversal car stability. Usually, the analysis of the roll motion is made in assumption that the roll axis is one with a fixed position, determined by static position of the suspension mechanism and car body. This paper tries to do a different approach by using a dynamic model of a car analyzed with MBS software ADAMS View. The model will be analyzed with a transversal load and the real roll axoid will be drawn in these cases using MATLAB.

**CALCULUL DE DIMENSIONARE AL ELEMENTELOR PRINCIPALE DE LA  
INSTALAȚIA HIDRAULICĂ DE LA MAȘINA DE SUDAT PRIN INERȚIE**

ARSENIE D.I., PERIDE N., GRAMA I., MÂRZA V., *Ovidius University of Constanta,  
Constanta, Romania*

**Abstract.** The purpose of this working is to establish the reactions in kinematics couplings of the mechanism, need reactions for calculation in sizing kinematics, in view to his design.

## **DIMENSIONAREA VOLANTULUI DE LA MAȘINA DE SUDAT PRIN INERȚIE**

ARSENIE D.I., GRAMA I., MÂRZA V., PERIDE N., *Ovidius University of Constanta, Constanta, Romania*

**Abstract.** The paper has the purpose to design a flyer with inertial variable momentum, of an inertial welding machine.

## **CUPLAJ CENTRIFUGAL REGLABIL**

BUDALĂ A., TĂNĂSESCU I., *Transilvania University of Brasov, Brasov, Romania*

**Abstract.** The paper presents a new type of centrifugal clutch. This is about a centrifugal actioned clutch with friction shoes. The newness derives from its adjustment possibilities. This construction allows the adjustment of the transmitted torque independent from turation or constructive dimensions.

## **STUDIUL ASUPRA ÎMBINĂRII NEDEMONTABILE A METALELOR NEFEROASE ÎN CÂMP ULTRASONOR**

CÂRJALI E., POMAZAN V., *Ovidius University of Constanta, Constanta, Romania*

**Abstract.** The ultrasound technology is an unconventional technology which is only at the beginning on national scale.

The ultrasound welding is a delicate and disputable fields, but also a very appreciable one. Due the advantages of ultrasound welding (low welding temperature, low remanent tensions level) this procedure can be also applied to non-ferrous welded structure.

## **CONSIDERAȚII PRIVIND ENERGIA DE DEFORMAȚIE LA ÎNCOVOIERE**

CÂRJALI E., *Ovidius University of Constanta, Constanta, Romania*

**Abstract.** To study the materials behaviour is an ultrasound field, it was built a stall where the samples were tested. The bending of the samples was measured with the help of the electric resistive decoders. The first step in the test procedure was to calibrate the decoders and then applying, only in the bending case, of the energetic computing methods of the in-line-elastic displacing.

## **SISTEM CAD-CAE PENTRU PROIECTAREA REDUCTOARELOR PLANETARE**

CERCEA S., MIHĂLCICĂ V., NEGREA L., BARNA A., *S.C. INAR S.A. Brasov, Romania*

**Abstract.** The papers show a new modern CAD-CAE system for design of planetary gears used in power transmission. The system has three parts. The first parts perform the geometric calculation and the control of geometric parameters. The user could rapidly and easily optimize these parameters.

The second parts analyze the strength and durability of gears. Computational programs use analytic procedures and also the user can verify program which statistical methods. The third part is a computer program which generate a drawing for each gear. This is a teeth profile drawing and also could be used for FEA with specialized software. This system was developed by using all experience accumulated during years in gears design for medium and heavy transmission.

## **MATRIȚĂ DINAMOMETRICĂ PENTRU CERCETAREA AMBUTISĂRII**

CHIOIBAȘ A., *The Navy Academy "Mircea cel Bătrân" Constanta, Constanta, Romania*

**Abstract.** În această lucrare se prezintă echipamentul tehnologic utilizat pentru studierea procesului de deformare în cadrul ambutisării succesive din bandă. Schimbarea rapidă a elementelor active asigură modificarea anumitor parametri în limitele anumitor valori, pentru care se stabilesc 3 niveluri de variație. Aceasta permite realizarea unui program experimental de tipul 3.

## **CONSIDERAȚII PRIVIND STABILIREA SARCINII DE CALCUL LA CUPLAJELE ELASTICE CU ELEMENTE NEMETALICE**

CHIȘU E., RADU M., *Transilvania University of Brasov, Brasov, Romania*

**Abstract.** The couplings choosing of specialty firms catalogues, respective the new couplings calculation are effects taking into consideration load of calculation. The determination of this is a problem of builder, which is indicating the factors who contribute to the diminution loading capacity of coupling. In paper is presenting choosing way of factors from correction the nominal torque, such is presented by builder firms.

## **EXPERIMENTAL RESEARCH PROGRAMME FOR HYPOCYCLOID AUTOMATIC MACHINE TOOLS FOR COLD FORMING**

CIOARĂ R. Gh., MĂRĂSCU-KLEIN V., PISARCIUC C., *Transilvania University of Brasov, Brasov, Romania*

**Abstract.** No machine tool working on the principle proposed for hypocycloid automatic machines has been developed so far. Consequently the area for experimental research is wide and unexplored. Naturally research methods and techniques applied for other classes of machine-tools can employed in this case too.

The paper presents selection instruments for the most adequate research techniques and methods. These are adapted to the particularities of hypocycloid automatic machine tools and to the objectives of the ongoing research. A logical frame of the research activity as well as some observations in relation to it are further presented.

## **CONSIDERATIONS ON THE SIGNIFICANCE OF SOME ELECTRONIC DATA OBTAINED IN THE EXPERIMENTAL RESEARCH ON HYPOCYCLOID MACHINE TOOLS**

CIOARĂ R. Gh., MĂRĂSCU-KLEIN V., PISARCIUC C., SÂRBU F., *Transilvania University of Brasov, Brasov, Romania*

**Abstract.** Experimental research on hypocycloid machine tools was carried out by different techniques and methods. The various required measurements were performed by modern electronic means of data acquisition.

The paper presents the equipment used and the main results that obtained. The interpretation of the data was carried out by comparison, including references to the theoretically expected results. The paper is completed by a number of observations and conclusions.

## **ADVANCED MATERIALS BASED ON ALUMINIUM COMPOSITE ALLOYS FOR THE ELECTROTEHNICAL INDUSTRY**

CRISTEA L., BRATU C., IONESCU M., *Politechnica University of Bucharest, Bucharest, Romania*

**Abstract.** The paper presents the elaboration of the aluminium alloys composite with graphite and the microstructural study for these composites. The new materials used in the electrotechnics industry for their good electrical properties.

## **ANALIZA CU ELEMENTE FINITE A PARAMETRILOR CUPLAJELOR CU TUB GOFRAT**

CRISTESCU R., MOGAN Gh., *Transilvania University of Brasov, Brasov, Romania*

**Abstract.** This work proposes the calculation of own frequency to the flexible couplings with metallic elastic elements of type bellow. The geometric model of this coupling is realized with performed calculation programs, which are based on the Finite Elements Method. This work paper finds its utility in avoiding the matter of resonance.

## **PRIVIRE FILOGENETICĂ ASUPRA REDUCTOARELOR DERIVATE DIN UNITĂȚI PLANETARE CU DOUĂ ROȚI CENTRALE**

DIACONESCU D., JALIU C., PASCALE L., *Transilvania University of Brasov, Brasov, Romania*

**Abstract.** A comparative outlook on the most representative solutions of reduction-gears, obtained from planetary units with two central gears is presented in this paper. The main directions of development for these planetary transmissions, their advantages and disadvantages are spotted in the paper. It is, also proposed a new direction of research, by extending the ideas of J. Vaucason referring to the increase of the internal ratio in the conditions of modern methods of modeling.

## MODELAREA STRUCTURAL-CINEMATICĂ A CUPLAJULUI TETRAPOD CU CANALE FLOTANTE DE TRANSLAȚIE

DUDIȚĂ F., LATEȘ M., SĂULESCU R., *Transilvania University of Brasov, Brasov, Romania*

**Abstract.** Lucrarea prezintă modelarea structural-cinematică a unui cuplaj tetrapod cu canale flotante de translație; mecanismul tetrapod analizat este derivat din sistemul binar bipod cu canale flotante. Obiectivul lucrării se referă la determinarea abaterii de la homocinetism și identificarea traiectoriilor unor puncte caracteristice ale cuplajului.

## AXIAL RESTRAINING EFFECT ON ELASTIC-PLASTIC BEAM BENDING

GĂVAN E., ȘERBAN D., *"Low Danube" University of Galati, Galati, Romania*

**Abstract.** The paper presents some considerations concerning the influence of the restriction rate to axial displacements on the deformation, in the plastic domain with deflection for a beam or a strip plate with cylindrical bending. An analytical method based on the principle of virtual displacements is employed. There are also included some results obtained with the Finite Element Method FEM.

## METODĂ DE ESTIMARE A DEFORMAȚIILOR LONGITUDINALE LA SUDAREA GRINZILOR ÎNTĂRITE

GĂVAN E., ȘERBAN D., *"Low Danube" University of Galati, Galati, Romania*

**Abstract.** In the fabrication of welded built-up beams, longitudinal deformations occur due to welding and they impede further work. For straightening of the deformations, heating of web is necessary. The conventional heating process depends on the experiences of skilled workers. In this paper, there is presented a simplified model for evaluation of the deformations that occurs to fabricating of the welded built-up beams and the relations for calculating the required curvatures and to cancel deformation by using line (zone) heating method.

## NITROGEN INFLUENCE ON CORROSION BEHAVIOR OF AUSTENITIC STAINLESS STEELS

GHIBAN B., COȘMELEAȚĂ G., GHIBAN N., *Politechnica University of Bucharest, Bucharest, Romania*

**Abstract.** Present paper has important contributions on nitrogen influence mechanism on mechanical characteristics and intergranular corrosion resistance of austenitic stainless steels. Investigations were made on three austenitic matrix steels (18%Cr-15%Ni-1%Mn-2%Mo), with different contents of nitrogen by optic and scanning electron microscopy. Corrosion resistance was determined by Streichert and Huey tests for intergranular corrosion resistance and by nonconventional tests for pitting corrosion resistance.

## ASPECTE DINAMICE ALE CUPLAJULUI TRIPOD CU CONTACTE DE TIP CILINDRU PE CILINDRU

LATEȘ M., JULA A., *Transilvania University of Brasov, Brasov, Romania*

**Abstract.** În lucrare se propune o modelare dinamică a cuplajului tripod cu contacte de tip cilindru pe cilindru. Se consideră că arborele de intrare al cuplajului este element motor, iar cel de ieșire, rezistent. Inițial, se determină tensorul inerțial al mecanismului asociat cuplajului, după care se identifică ecuațiile lui Lagrange de speța a II-a. Simularea comportării dinamice este realizată utilizând soft-ul SIMULINK.

## INTERPRETATION OF CRANKSHAFTS RESISTANCE TESTS

LUCA A., BEJAN C., GAL M., *The Research Institute for Motor Vehicles, INAR Brasov, Romania*

**Abstract.** The present paper treated the interpretation of thermal engine crankshafts experimental results. The costs of research and the uncertainty in establishing of an adequate program testing for mechanical high complexity parts are important. To surpass that difficulties the authors are operating in the direction of information assembly utilization acquired by stand tests and from exploitation furnished by the special bibliography. The interpretations proposed in this paper are proved scientifically by the proper concepts of reliability theory nucleus and in a particular manner to preestablish the correlation between the test results and Weibull repartition using Allan Plot probability network. That theory is adequate and more impressive in engineering practice order to the analytical relationship of correlation. In the worksheet are distinguished the next conclusions. Duration repartitions at the first failure are three-parametric Weibull, correcting the conclusions of expensive and interesting experiments on stands, performing by a German researcher. The results registered from exploitation research by the authors of this paper confirm the three-parametric Weibull repartition.

## MODELAREA FUNCȚIONĂRII SISTEMULUI (s,S,R) DE GESTIUNE A STOCURILOR CU AJUTORUL REȚELELOR PETRI

LUNGU F., ABRUDAN I., *Technical University of Cluj-Napoca, Romania*

**Abstract.** Lucrarea prezintă posibilitățile pe care le oferă modelarea și analiza sistemului de gestiune a stocurilor (s,S,R) cu ajutorul rețelelor Petri. Rețelele Petri fac parte din principalele tehnici de modelare folosite pentru evenimente asincrone.

Analiza unui model are ca obiective principale verificarea unor proprietăți generale ale modelelor din categoria respectivă, precum și verificarea unor proprietăți specifice modelului analizat, confirmarea existenței proprietăților menționate atestând că structura modelului adoptat este corectă, iar infirmarea existenței unor anumite proprietăți indicând prezența unor erori de modelare. În cazul rețelelor Petri, principalele proprietăți verificate prin analiză sunt: viabilitatea, reinițializarea și limitarea.

Modelarea sistemelor de gestiune a stocurilor cu ajutorul rețelelor Petri este importantă deoarece în acest mod se poate încerca optimizarea funcționării sistemelor de stocuri și a reducerii costurilor legate de acestea, știindu-se că o optimizare a parametrilor sistemelor este

dificilă și nu întotdeauna practică pentru cazuri reale.

## **ELEMENTE NOI PRIVIND PROIECTAREA SISTEMELOR DE CONTROL FEEDBACK BAZATE PE CARACTERISTICI DE CALITATE**

CONSTANTIN M.<sup>a</sup>, VASILE A.M.<sup>b</sup>, MELNIC L.V.<sup>b</sup>, *<sup>a</sup>Politechnica University of Bucharest, Bucharest, Romania, <sup>b</sup>Ovidius University of Constanta, Constanta, Romania*

**Abstract.** În această lucrare se exemplifică controlul proceselor ca un sistem de control feedback. Sub controlul feedback, caracteristicile unui produs obținut într-un proces de producție este verificat și dacă diferența dintre caracteristică și etalon este mai mare decât un anumit nivel, procesul este ajustat astfel încât revine la condițiile normale. Dacă diferența nu este atât de mare, procesul continuă fără ajustare. Schema acestui tip de sistem de control poate fi aplicată fără modificări în cazuri unde procesul este controlat automat. Chiar dacă un proces este controlat automat, controlul uman de rutină este necesar.

## **CONTRIBUȚII PRIVIND OPTIMIZAREA RAPORTULUI S/N UTILIZÂND DIAGRAMA PARAMETRULUI**

CONSTANTIN M.<sup>a</sup>, MELNIC L.V.<sup>b</sup>, VASILE A.M.<sup>b</sup>, *<sup>a</sup>Politechnica University of Bucharest, Bucharest, Romania, <sup>b</sup>Ovidius University of Constanta, Constanta, Romania*

**Abstract.** Lucrarea prezintă un model de optimizare în două etape al raportului S/N, cu ajutorul unei diagrame bloc al unui produs, numită diagrama parametrului sau diagrama P. această diagramă poate fi folosită pentru reprezentarea unui proces de fabricație sau în general a unui sistem. Sunt prezentate probleme de proiectare inginerească (probleme statice și dinamice), dezvoltate cu ajutorul raportului S/N.

## **ELASTIC IDENTIFICATION OF A COMPOSITE MATERIAL USING FINITE ELEMENT METHOD**

MODREA A., GOIA I., VLASE S., *Transilvania University of Brasov, Brasov, Romania*

**Abstract.** A composite material has, generally, mechanical properties that cannot obtain in a simple manner in terms of the mechanical properties of each component. There exists many procedures to compute these values but, in the most cases, the computational effort is substantial. When the relations obtained are more suitable they are only an approximate of the exact values. In this case the used of finite element is a powerful tool to obtain the stresses/strains field and, after this, to determine to elastic constants. In order to compute the elastic parameters for a composite material (especially in the case for a two phases fiber reinforced plastic) is used a finite element procedure to know the field of stresses and strains. In the paper are presented the relations that made possible to obtain the necessary elastic parameters. It is obviously that the effort to obtain the elastic constants is made via finite element method, a very well known and used method. These way changes the difficult methods used to compute these values, based on mechanical models or variational principles, with a numerical procedure.

## THE INFLUENCE ON THE DIMENSIONAL DIFFERENCES ON THE MECHANICAL PROPERTIES OF A COMPOSITE

MODREA A., GOIA I., VLASE S., *Transilvania University of Brasov, Brasov, Romania*

**Abstract.** During the manufacture process of a composite and after this, during the use of the material, there exists many ways in which the real material can have differences in comparison with the theoretical composite considered as a succession of a repeating cell. Sometime these differences can be great enough and they can have a major influence on the properties of the composite. In the paper we try to present how these differences can influence the elastic constants of such material.

## MODEL DE OPTIMIZARE A CUPLAJELOR UNISENMS CU ROLE CILINDRICE CIRCULARE

MOGAN Gh., *Transilvania University of Brasov, Brasov, Romania*

**Abstract.** In this paper it is presented a geometric and static optimization model of one way clutches with cylindrical rollers as wedging elements. The proposal model contains an objective function and inequality constraints. The objective function is considered the transmitted torque by one-way clutch that must be maximized. As constraints are determined relations about functionality, geometric and strength a materials conditions.

## PROIECTAREA OPTIMIZATĂ A CUPLAJELOR DE SIGURANȚĂ CU BILE ȘI CANALE TRAPEZOIDALE DISPUSE RADIAL

MOLDOVEAN Gh., VELICU D., GAVRILĂ C.C., *Transilvania University of Brasov, Brasov, Romania*

**Abstract.** The paper presents an approach for the optimal design of safety clutches with balls and radial trapezium rabbits. At the beginning there are presented the criteria of optimization that the designer have to take at design a safety clutch with balls and radial trapezium rabbits. These optimization criteria are: the safety clutch has to transmit a torque that to make sure to running the transmission with the same safety clutch; the possibility transmitted torque has to be bigger at the same overall dimensions; precision of uncoupling has to be higher; sensibility of uncoupling has to be higher; effective contact stress of the balls has to be close by permissible stress.

After presentation those optimization criteria, these are presented, in a logical sequence, the design stages, easy to use for software development. Inputs, the materials and heat treatments for balls and half-clutches dimensioning and verification relationships and optimization mode are the main stages presented.

## PROIECTAREA ASISTATĂ A CUPLAJELOR DE SIGURANȚĂ CU BILE ȘI CANALE TRAPEZOIDALE DISPUSE RADIAL

MOLDOVEAN Gh., VELICU D., GAVRILĂ C.C., *Transilvania University of Brasov, Brasov, Romania*

**Abstract.** The paper presents software for the optimal design of safety clutches with balls and radial trapezium rabbits, which uses the library of Windows objects. The software considers a number of optimization criteria: the safety clutch has to transmit the torque that ensure the maximum load capacity of the transmission, without beginning the uncoupling process; the loading capacity has to be higher at the same overall dimensions; precision of uncoupling has to be higher; sensibility of uncoupling has to be higher; effective contact stress of the balls has to be close to permissible stress.

By means of the main images taken from display, the dialogue between the designer and computer and the way to obtain an optimal constructive solution of these clutches are illustrated.

### **STUDY OF TRIBOLOGICAL PARAMETERS OF BEARINGS SEPARATOR MADE FROM Al/GRAPHITE AND Al/SiC COMPOSITES MATERIALS**

MOLDOVAN P<sup>a</sup>., POPESCU G.<sup>a</sup>, DANILA F.<sup>b</sup>, APOSTOLESCU I.<sup>a</sup>, *<sup>a</sup>Polytechnic University Bucharest, Romania, <sup>b</sup>S.C. Koyo S.R.L. Alexandria, Romania*

**Abstract.** The aim of this paper was represented by the tribological characterization of bearings fabricated from Al/SiC and Al/Graphite composite materials. Picking out the results of melting and centrifugally casting of these composite materials, we obtained bearings with an increased workability and a significant reduction in the noise level in comparison with classical bearings. Correlated with the requirements imposed by the bushing functional role, low friction coefficient, reduced tendency of seizing, corrosion stability and high resistance, ten 6025 MA bearing were processed in identical conditions.

Analyzing the obtained results we can notice: a good behavior of 1,2,4 bearings; a very good behavior of 5,6 bearings and a satisfactory behavior of 7,8,9 bearings.

### **MODELAREA NUMERICĂ A ARDERII PICĂTURII DE COMBUSTIBIL LICHID MARIN ELABORATĂ CU AJUTORUL METODEI ELEMENTELOR FINITE**

MOROIANU C., FLOREA T., ALI B., *The Navy Academy "Mircea cel Bătrân" Constanta, Constanta, Romania*

**Abstract.** A mathematical model of ignition of a liquid fuel droplet in hot oxidizing surroundings was proposed. The model was solved numerically by the finite element method. The droplet ignition delay periods were calculated as a function of ambient temperature, oxygen concentration, initial droplet diameter and activation energy.

### **NUMERICAL PREDICTION OF SAUTER MEAN DIAMETER AND DROPLET SIZE DISTRIBUTION IN SPRAYS**

MOROIANU C., FLOREA T., ALI B., *The Navy Academy "Mircea cel Bătrân" Constanta, Constanta, Romania*

**Abstract.** A simplified equation for droplet size distribution in sprays is obtained from the synergetic concept of entropy information, assuming spherical droplets and zero and infinity

as their limit sizes. The introduction of Sauter mean diameter (SMD) definition in that equation yields a new distribution function dependent solely on SMD, which is calculated from available correlations for pressure-jet and pre-filming air blast atomizers. For plain-jet air blast atomizers a new and dimensionally consistent correlation is determined. Several droplet size distributions are then predicted.

## **ON THE ACCURACY MODELING OF CLASSICAL CARDAN MECHANISM**

NEAGOE M., SĂULESCU R., MĂȚĂUANU M., BRAUN M., *Transilvania University of Brasov, Brasov, Romania*

**Abstract.** The study of the precision of a mechanism with the kinematics rank smaller than six needs first of all a kinematics analysis on a spatial configuration (of kinematics rank six), the analyzed mechanism being a particular case of it. Starting from two different spatial configurations, RCCC and RRRC/S, the precision of a classical cardan mechanism (spherical) is analyzed in this paper; the comparative analysis of results allows to formulate useful conclusions for research and design.

## **ON THE ACCURACY MODELING AND CALIBRATION OF A STEWART PLATFORM**

NEAGOE M.<sup>a</sup>, PASCALE L.<sup>b</sup>, NEAGOE A.<sup>a</sup>, *<sup>a</sup>Transilvania University of Brasov, Brasov, Romania, <sup>b</sup>University Valahia of Targoviste, Romania*

**Abstract.** This paper presents the main aspects and representative results of the kinematics calibration applied to a Stewart platform. An accuracy model of Stewart platform is firstly presented. This model takes into account the errors of the geometrical parameters related to their nominal values. A general method for the precision modeling of parallel robots is proposed by the authors and applied in the case of Stewart platform. Next, on the base of precision model and experimental data for the accuracy of the Stewart platform, some algorithms used in kinematics calibration were generated and tested; overcoming some numerical difficulties, the errors of geometrical parameters were identified. Thus, the correct values of geometrical parameters and, implicitly, the correct kinematics model used in command/control were obtained. Finally, the calibration importance in optimization of the kinematics models of parallel robots is emphasized, based on the numerical results. According of these aspects, the accuracy of the Stewart platform model was significantly increased.

## **MODERN CLUTCHES AND CONTROL SYSTEMS FOR TRUCKS AND BUSES**

NENCIU I., MIRON I., COTINGHIU M., CIURDAR M., *S.C. INAR S.A. Brasov, Romania*

**Abstract.** The paper comprises several technical solutions used by the famous clutch and clutch controls manufactures destined to equip road vehicles. The first chapter of the paper presents some mechanical clutch designs (monodisk and bidisk), having pressure spring diaphragm type, in pushing and pulling ways of operating. The varieties of mechanical clutches with diaphragm, operated by pulling are strongly appreciated, world wide, due to the special advantages they offer, compared to the other types of clutches, manufactured in the

country presently (helicoid springs and diaphragm clutches, operated by pushing). In the second chapter of the paper, these are presented a technical solution of hydraulic control of a self-adjusting clutch.

These is also presented in this chapter a clutch control equipped with a pneumatic valve, that is used with new types of controls of truck and bus gears. These new types of controls are different from the classical ones in the fact that they are not electro-pneumatic types but only pneumatic, that brings a series of important advantages: simplify the solution, lowers the manufacturing costs and increase the reability of these systems.

## THE INTERACTION BETWEEN TITANIUM BASE ALLOYS AND MATERIALS WITH CARBIDE CONTENT

NOCIVIN A.<sup>a</sup>, CIUCA I.<sup>b</sup>, *<sup>a</sup>Ovidius University of Constanta, Romania, <sup>b</sup>Polytechnical University of Bucharest, Romania*

**Abstract.** In this paper we have studied the interaction between ( $\alpha+\beta$ ) titanium base alloys and silicon carbide fibres, covered with carbon or with two layers from carbon and titanium carbide.

## REVERSE MARTENSITE TRANSFORMATION $\alpha''\rightarrow\beta$ IN BIPHASIC ALLOYS

NOCIVIN A.<sup>a</sup>, CIUCA I.<sup>b</sup>, *<sup>a</sup>Ovidius University of Constanta, Romania, <sup>b</sup>Polytechnical University of Bucharest, Romania*

**Abstract.** In this paper we have studied the mechanism and the kinetics of reverse transformation  $\alpha''\rightarrow\beta$  for some biphasic titanium base alloys. We have established that this kind of transformation is a martensitic one and may produces by a non-thermic kinetics or isotherm one.

## CERCETĂRI PRIVIND STABILIREA PARAMETRILOR DE SUDARE CU ULTRASUNETE A MASELOR PLASTICE

NOVAC M.<sup>a</sup>, NOVAC Gh.<sup>b</sup>, BORMAMBET M.<sup>c</sup>, ZAMFIRESCU G.<sup>c</sup>, *<sup>a</sup>S.C. ROMAN S.A. Brasov, Romania, <sup>b</sup>Transilvania University of Brasov, Romania, <sup>c</sup>Ovidius University of Constanta, Romania*

**Abstract.** În lucrare sunt prezentate o serie de variante de sudare a maselor plastice cu ajutorul ultrasunetelor, în stare solidă, utilizate în special la produse de uz casnic.

Energiile utilizate la sudare sunt vibrațiile mecanice cu frecvențe cuprinse între  $16\cdot 10^3$ - $10^{10}$ Hz, peste care sunt suprapuse forțe de presare a celor două componente. De asemenea, în lucrare sunt prezentate influențele diferiților parametri tehnologici asupra calității îmbinărilor sudate.

## **INFLUENȚA ORDINII DE SUDARE LA ȚEVILE CU DIAMETRE PESTE 60 mm ASUPRA CALITĂȚII ÎMBINĂRILOR SUDATE**

NOVAC Gh.<sup>a</sup>, NOVAC M.<sup>b</sup>, BORMAMBET M.<sup>c</sup>, ZAMFIRESCU G.<sup>c</sup>, *<sup>a</sup>Transilvania University of Brasov, Romania, <sup>b</sup>S..C. ROMAN S.A. Brasov, Romania, <sup>c</sup>Ovidius University of Constanta, Romania*

**Abstract.** În lucrare este prezentată influența ordinii de sudare asupra proprietăților mecanice și structurale ale îmbinărilor sudate. Această influență este mult mai accentuată la oțelurile aliate și slab aliate.

## **CERCETĂRI PRIVIND POSIBILITATEA MĂRIRII DURABILITĂȚILOR ȘTANȚELOR ȘI MATRIȚELOR**

NOVAC Gh., *Transilvania University of Brasov, Romania*

**Abstract.** În lucrare sunt prezentate atât metodele de remediere a ștanțelor și matrițelor uzate, cât și realizarea lor din materiale noi. Metodele utilizate sunt cele de încărcare prin sudare utilizând diferite procedee de încărcare și materiale de adaos diferite.

## **PRINCIPALELE CALITĂȚI ALE MEDIILOR DE RĂCIRE ȘI INFLUENȚA LOR ASUPRA PROPRIETĂȚILOR OȚELURILOR**

PETERFI I.<sup>a</sup>, NOVAC Gh.<sup>b</sup>, NOVAC M.<sup>c</sup>, *<sup>a</sup>Ovidius University of Constanta, Romania, <sup>b</sup>Transilvania University of Brasov, Romania, <sup>c</sup>S..C. ROMAN S.A. Brasov, Romania*

**Abstract.** În lucrare sunt prezentate calitățile mediilor sintetice de răcire. De asemenea, sunt prezentate mai multe tipuri de medii de răcire cu influența lor asupra proprietăților oțelurilor.

## **INTEGRATED SHAPE AND TOPOLOGY OPTIMIZATION IN THE DESIGN PROCESS**

POMAZAN V., CARJALI E., *Ovidius University of Constanta, Romania*

**Abstract.** The ultimate goal in concurrent engineering of structures is to achieve simultaneously in the design stage the following objectives: (1) A shape that performs its function, conforms with the boundary conditions, and can support the external loads. (2) A product with structural integrity, i.e. with stress levels remaining below acceptable limits. (3) A product with acceptable performance, e.g. modal dynamics, i.e. with natural frequencies and mode shapes that do not amplify external dynamic loads; and static, i.e. acceptable deflection. (4) A composite microstructure that can optimally satisfy the above topology/shape, load, and performance constraints. (5) A microstructure fabrication process that efficiently produces the above optimal structure. The paper presents the main issues regarding methods used in optimization problems in mechanical structure problems.

## CONCURRENT ENGINEERING DESIGN ISSUES

POMAZAN V., *Ovidius University of Constanta, Romania*

**Abstract.** The ultimate goal in concurrent engineering of structures is to achieve simultaneously in the design stage the following objectives: (1) A shape that performs its function, conforms with the boundary conditions, and can support the external loads. (2) A product with structural integrity, i.e. with stress levels remaining below acceptable limits. (3) A product with acceptable performance, e.g. modal dynamics, i.e. with natural frequencies and mode shapes that do not amplify external dynamic loads; and static, i.e. acceptable deflection. (4) A composite microstructure that can optimally satisfy the above topology/shape, load, and performance constraints. (5) A microstructure fabrication process that efficiently produces the above optimal structure. The paper presents the main issues regarding methods used in optimization problems in mechanical structure problems.

## TRANSMISSION BOX SERIES FOR COMMERCIAL VEHICLES AND PUBLIC TRANSPORT

RADU G., FORIZS M., ACZEL B., ZVOLINSCHI B., BALARAU I., *S.C. INAR S.A. Brasov, Romania*

**Abstract.** The paper presents a mechanical transmission box series having six and twelve steps being synchronized in all steps destined to light commercial vehicles and urban and extra urban buses.

The transmission box designs contain ultimate solutions: housing having frontal separation sections, gears with modified geometry in order to increase charge and to lower the transmission noise.

## DETERMINATION OF PHYSICAL-MECHANICAL FEATURES FOR THE WOOD BASED BOARDS, USING NON-DSTRUCTIVE METHODS

SAVA R., *Transilvania University of Brasov, Romania*

**Abstract.** This work aim at showing non-destructive methods in an overview of physical-mechanical characteristics of wood based boards. It is mentioned particularly investigations using fields and also a method for predicting Internal Bond, using ultrasonic velocity perpendicular to the panel surface.

## VIBRATION TECHNIQUE USED TO ESTIMATE DYNAMIC MODULUS OF ELASTICITY FOR THIN WOOD BASED BOARDS

SAVA R., *Transilvania University of Brasov, Romania*

**Abstract.** A method to estimate Dynamic Modulus of Elasticity ( $MOE_{DYN}$ ) by using vibration technique, is shown in this paper. Some values of  $MOE_{DYN}$  for softwood plywood samples have been determined. There is a correlation between  $MOE_{DYN}$  and other physical-mechanical features.

## UNELE ASPECTE PRIVIND MANAGEMENTUL PROIECTELOR

SAVESCU D., *Transilvania University of Brasov, Romania*

**Abstract.** This paper presents some aspects regarding the project management, some ideas concerning the quality, time, budget and expectations of the participants. There are also presented some aspects concerning the feasibility study.

## EXPERIMENTAL RESEARCH UNDER STEADY-STATE FLOW CONDITIONS ON INLET AIR FLOW AT DIRECT INJECTION DIESEL ENGINE MULTIVALVE CYLINDER HEAD

SOREA O., ADOREAN E., COTINGHE N., PALER P., *S.C. INAR S.A. Brasov, Romania*

**Abstract.** This paper presents results obtained under steady-state flow conditions, for cylinder head with 16 valves of 250-L4-DTI-High-Speed Injection, (H.S.D.I.), Diesel engine with four cylinders in line, turbocharged with intercooler, situated in prototype stage of construction at Research Institute for Motor Vehicles – INAR S.A. Brasov.

Also investigated the effect of inlet ports geometry on swirl intensity and in-cylinder air flow at cylinder-head with multivalve technique, and swirl number variation for optimization of the fuel-air mixing as a function of engine load and speed, when used the swirl throttle.

## PREDIMENSIONAREA ANGRENAJELOR HIPOIDE

VELICU D., MOLDOVEAN Gh., GAVRILA C.C., *Transilvania University of Brasov, Romania*

**Abstract.** This paper presents the relationships of the calculus, recommendations needed for the determination of the main geometrical elements of wheels of the hypoid bevel gear, the relationships for pre-dimensioning calculus at contact stress and bending stress, and the factors and coefficients needed for calculus. These are presented in a table, in logical sequence, being conditioned by axle distance from wheels. Pre-dimensioning calculus follows the established dimensions of wheel, because the teeth of this are strong stress comparatively with teeth of pinion.

Stages of the pre-dimensioning calculus are good for every possible type of hypoid bevel gear (circle, helioid and palloid). The proposed calculus relationships are recommendations for pre-dimensioning hypoid level gears may be easy to use for software development that will improve the efficient design of these gears.

## OPTIMAL SYNTHESIS OF CO-AXIAL SPEED REDUCERS

VELICU R., *Transilvania University of Brasov, Romania*

**Abstract.** The problem of choosing the optimal scheme of speed reducers is one of the first to be solved in the process of designing transmissions with reducers. The co-axial speed reducers can use one of the two specific solutions: with two spur or helical gears or with

planetary gears. In choosing between these solutions few criteria like load capacity, volume and costs must be considered. The paper is giving recommendations for choosing the optimal solution of speed reducers.

## **FINITE ELEMENT ANALYSIS OF FLEXIBLE MECHANISMS**

VLASE S., DELIU Gh., *Transilvania University of Brasov, Romania*

**Abstract.** In many cases when a study of multi-bodies systems is perform, the hypothesis of rigid elements is considered. In reality the elasticity of the components of the system can be enough so that dynamic response can be not only qualitative different. For this reason, in some applications, particularly in the field of robotics and high-speed vehicles, is necessary to consider the elasticity of elements and to use correspondent models. Generally, the multi-bodies systems have a great complexity and the strong non-linearity. To study such system with the classic mechanisms theorems is not a practical task because the motion equations gave, generally, no analytical solutions. For this reason is necessary to use numerical methods and the finite element methods (FEM) remains one of the most important tools.

## **METODE HIBRIDE DE CONTROL A TRAIECTORIILOR ROBOTILOR INDUSTRIALI**

CHIRCOR M., ZAGA R., CHITU M., *Ovidius University of Constanta, Romania*

**Abstract.** In this paper there is presented a study of the methods used for the control of the motion when the end-effector is moving along a partial trajectory.

A classification of the control methods is presented.

We will determine the most efficient method for the control of the path generation of spatial trajectories.

An application is also presented.

## **VALIDATION AMONG THEORETICAL CALCULATIONS OF THE PROPELLER HARMONIC EXCITATION AND EXPERIMENTS**

BUZBUCHI N.<sup>a</sup>, MANEA L.<sup>b</sup>, MANEA A.<sup>b</sup>, PETRESCU D.<sup>a</sup>, *<sup>a</sup>Maritime University of Constanta, Romania, <sup>b</sup>Ovidius University of Constanta, Romania*

**Abstract.** The paper is an attempt to the harmonic structure computation of the marine propeller torque and thrust, being predictive methods of propeller excitations induced into the marine engine shafting system in the design stage. Two quasi-steady methods using the lifting line theory, the first being semi-theoretical due to the wake field experimentally determined and based using only the propeller series diagrams and general empirical formulae for the wake and suction coefficients, have been presented.

The paper shows the simplicity and accuracy of the last method, as primary information on the propeller excitations, and this procedure takes into account a non-dimensional expression of the circulation, as a two-dimension function of blade radius and angle of rotation. A validation calculation with experiments of propeller excitations induced into the shafting

system is analyzed, showing acceptable agreement between calculated and measured excitations.

## **GLOBALIZAREA ÎN INDUSTRIA AUTOMOBILULUI**

MANEA L., MANEA A., POPESCU C., PETRESCU D., *Ovidius University of Constanta, Romania*

**Abstract.** The paper presents some aspects regarding the globalization process with the automotive developing markets.

## **SOLUȚII MODERNE DE CREȘTERE A SECURITĂȚII OCUPANȚILOR ÎN CAZUL ROSTOGOLIRII VEHICULULUI**

MANEA A.<sup>a</sup>, MANEA L.<sup>a</sup>, PETRESCU D.<sup>a</sup>, BUZBUCHI N.<sup>b</sup>, *<sup>a</sup>Ovidius University of Constanta, Romania, <sup>b</sup>Maritime University of Constanta, Romania*

**Abstract.** The paper presents the Head-Up Display Vision System, which in authors view must be part of the information support of man-vehicle management on the drive way.

## **SOLUȚII NOI ÎN PROCESAREA INFORMAȚIILOR CONDUCĂTOR-VEHICUL**

MANEA A.<sup>a</sup>, MANEA L.<sup>a</sup>, PETRESCU D.<sup>a</sup>, DUMITRESCU C.<sup>b</sup>, *<sup>a</sup>Ovidius University of Constanta, Romania, <sup>b</sup>Ministerul Justiției, Bucharest, Romania*

**Abstract.** The paper presents the Head-Up Display Vision System, which in authors view must be part of the information support of man-vehicle management on the drive way.

## **PREZENT ȘI PERSPECTIVĂ ÎN SIGURANȚA OCUPANȚILOR AUTOMOBILULUI**

MANEA A., MANEA L. PETRESCU D., *Ovidius University of Constanta, Romania*

**Abstract.** The paper presents the first researches realized in order to develop some new ideas in the field of security of the driver and occupants of the car, in the case of an accident.