

# ABSTRACT

## Metalurgia International vol XIV(2009) no.5

### VIZUREANU PETRICA THE ANALYSIS OF THE MELTING PROCESS OF THE MATERIALS IN THE SOLAR FURNACES

**Key words:** solar, furnace, melting, process, energy.

**Abstract:** The production of steel or aluminium requires huge amounts of energy. This can be given, in a normal way, by the electric power, natural gases or conventional fuel. The solar furnace uses the energy given by the power of the Sun. The image shows that the rays can be focused towards the crucible where the ore is. This is heated at a very high temperature, till it melts and can be cast. There is practically **no pollution** because solar energy is a **clean form of energy**.

One of the most important applications of the solar furnaces is that of melting materials with very high melting point. If the surface of a solid material is exposed to intense radiation from the focal area of a solar furnace, the material melts on a surface which is equal to the area of the Sun's image. As the heat penetrates in the solid body, the quantity of the melted metal increases and a liquid cavity forms.

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### LUMINITA BIBIRE, GHENADI ADRIAN, LILIANA TOPLICEANU, STAMATE MARIUS, COBREA CODRIN, ULERIU DORIN COLLECTION OF SAMPLES, MACROSCOPIC AND FRACTOGRAPHIC ANALYSIS FOR DETERMINING CAUSES OF DAMAGE TO A FIREPROOFED TUBULAR BOILER, WITH AN UNDULATED FLAME TUBE WITH THREE GAS WAYS FROM A HEATING PLANT

**Key words:** crack, fracture, material, flame tube, samples, welding

**ABSTRACT:** Damage has occurred, at no. 2 boiler from heating plant of a petrochemical platform, during its startup in order to dry the embrasure gunite of the flame tube. Damage was consequently deteriorate the boiler and the adjacent installations, the death of a fireman and injury of two other workers that required hospitalization.

Article authors have investigated the mechanism of damage production and the causes of its production

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### GHENADI ADRIAN, LUMINITA BIBIRE, LILIANA TOPLICEANU, OBREJA CLAUDIU

#### THEORETICAL AND EXPERIMENTAL STUDIES REGARDING THE FATIGUE PROPERTIES, AT LIMITED NUMBER OF LOADING CYCLES, OF PLANAR ROBOTS STRUCTURES

**Key words:** fatigue loading, planar robots, Wohler diagrams, oligocyclic preloadings

**ABSTRACT:** It is well known that the fatigue loading is the principal cause for a bad operation or failure of mechanical structures of industrial robots. So is very important to study the behavior under fatigue loading of the material from which the mechanical structures are made of. So this paper presents a study on 13MoCr4-5 steel to understand the relations between plastic cyclical deformation and absorbed energy and number of cycles until failure.

Experimental researches have been made in order to determine and to plot the curve of fatigue in oligocyclic domain.

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### VERMESAN HORATIU, ANDREEA HEGYI, VERMEŞAN GEORGE, BULEA CAIUS THE INFLUENCE OF HOT DIPPED GALVANIZATION OVER THE CORROSION OF THE REINFORCEMENT STEEL OF THE CONCRETES

**Key words:** corrosion speed, reinforcing steel, pH.

**Abstract:** The corrosion is a complex phenomenon that depends on the composition and structure of the metallic material, the nature and composition of the corrosive environment, as well as on the conditions where the reactions take place. The presence of the electrolytes in the aggressive environment influences the corrosion speed. In the category of the electrolytes with a strong corrosive action is also included the sodium chloride - NaCl. In the hereby paper there are presented aspects related to the OB 37 steel corrosion (carbon steel encountered as material of reinforcement of the reinforced concrete elements) in sodium chloride solutions, the influence of the electrolyte concentration, the variation in time of

the corrosive processes and the pH influence of the corrosive environment.

**Metalurgia International vol XIV 2009 pg.22**

### IVĂNUŞ RADU CRISTIAN TUNGSTEN-COPPER METAL MATRIX COMPOSITES FOR PACKAGING HEAT SINK APPLICATIONS

**Key words:** metal matrix composite, tungsten-copper, chemical process, heat sink

**ABSTRACT:** Heat dissipation technology in electronics packaging is a critical element in nearly all new chip generations, caused by a power multiplication combined with a size reduction. In order to guarantee their high end performance the generated thermal energy has to be removed out of packages. MMC's, using copper as the continuous matrix phase and a refractory metal such as tungsten as reinforcement, have been used extensively during the last two decades providing both high thermal conductivity (TC) and a coefficient of thermal expansion (CTE). In this study, the preparation of W/Cu composite powders by a wet chemical process based on the reduction of a selected copper precursor in aqueous solutions in the presence of tungsten powder has been developed. Reactions were performed in different conditions of temperature, time and concentration of the copper precursor.

Aqueous solutions of formaldehyde were selected as reducing agent.  $\text{CuSO}_4 \cdot 5 \text{H}_2\text{O}$  and tungsten powder (4.16  $\mu\text{m}$ ) were used. The reaction yields, the density of the sintered bodies, dilatometric analysis and the microstructure were examined by sintering W/Cu powders at temperatures up to 1350°C. The measured TC lies among theoretical values predicted by several existing models.

**Metalurgia International vol XIV 2009 pg.26**

### CLAUDIA TĂNASE, DIMA ADRIAN, STRECHE VALENTIN IMPROVED SOLUTIONS FOR THE PNEUMATIC ROCKET FORI 80 FOR DITCHLESS UNDERGROUND PIPE LAYING

**Key words:** pneumatic rocket, underground lay, pipe lay, ditchless

**Abstract:** High-technology, direct, ditchless underground pipe laying is a challenge because there still are improved solutions to be applied to the specifically designed pneumatic rocket FORI 80. Analyzing the internal structure of the experimental model, you can notice the technical opportunities if replacing a certain rigid steel part by a flexible one. Replacing the rigid (steel) feeding rod by an elastic one (made of combined rubber and Teflon) is something original in the present-day Romanian technology of building pneumatic rocket improved models.

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### ANIŞOARA CORĂBIERU, VELICU STEFAN, ZAIT DUMITRU, CORĂBIERU PETRICĂ, VASILESCU DAN DRAGOŞ RESEARCHERS REGARDING SUPERFICIAL HARDENING OF THE PLASTIC DEFORMATION TOOLS BY ZONAL PHASES MODIFICATIONS

**Key words:** superficial hardening plastic deformation tools

**ABSTRACT:** Some of the most utilized metallic materials used in the industry all over the world are the steels with superficial wear resistant layers hardened by zone phases modifications, manufactured as plastic deformation tools, strips, cylinders or containers. The researches undertaken by the authors had as objective the establishment of a new technique of superficial hardening by zone phase's modifications of the plastic deformation tools. The technological procedure shown in the work has a novelty character, ensuring by induction heating in metallic powders and carburising elements mixtures a superficial hardening of the plastic deformation tools by zone phase's modifications.

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**ERMINA ȚAPU, RUXANDRA ȚAPU , IONEL SIMION  
SIMULATION TECHNIQUES OF THE CONTACT RESISTANCE  
IN ADHESIVE CONDUCTORS**

**Key words:** conductive adhesive, filler, constriction resistance, tunneling resistance

**ABSTRACT:** *In this paper we establish the contact resistance obtained after modeling and simulating a conductive adhesive with epoxy resin matrix and filler conductor particles with different shapes. The adhesion process is evaluated taking into consideration the environment protection. It is desired to interdict or reduce the use of plumb in the solder paste, and the conductive electric adhesive represent an ecological alternative to the soldering paste with plumb*

**Metalurgia International vol XIV 2009 pg.45**

**BENDIC VASILE, CLAUDIA ȘERBAN  
CONCEPTS ON STATISTICAL PERFORMANCE OF  
TECHNOLOGICAL PROCESSES**

**Key Words:** process capability, statistical performance process, statistical process management.

**Abstract:** *In this short note we try to advocate that the so-called concept of process capability has to be replaced by a wider one called Statistical Performance Process (SPP) which includes the state of stability (control) and statistical performance level (SPL) defined by process potential and process capability as regards its location.*

**Metalurgia International vol XIV 2009 pg.52**

**M.N. MIHĂILESCU , A. DIMA , I. RUSU  
RESEARCH CONCERNING THE OBTAINING OF POROUS  
PERMEABLE SINTERED MATERIALS BASED ON COPPER,  
DESTINED FOR FILTERS**

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**GABA AUREL , CATANGIU ADRIAN ,VIOLETA  
ANGHELINA  
DESIGN AND EXPERIMENTAL RESULTS OF HIGH  
TEMPERATURE TUNDISH HEATER.**

**Key words:** tundish heater, design, experimental results.

**Abstract:** *This paper presents a new automatic drying and heating unit designed for circular tundish heating, which has as components two impulse burners, a radiation preheater, an automatic control system and a lifting system. The automated drying and heating tundish unit has been designed by using two suitable software, one for temperature and industrial flame composition determination and another for radiation preheater calculation. The goal for using software was natural gas consumption optimization. The experimental results obtained by measurement in industrial condition are shown the achieving of 1500°C heating temperature and a very good heating uniformity.*

**Metalurgia International vol XIV 2009 pg.61**

**VASILESCU MARIUS  
ANALYSE OF COLD PLASTIC DEFORMATION OF 2090 ALLOY**

**Key words:** cold plastic deformation, alloy, aluminium, behaviour, 2090

**ABSTRACT:** *The experimental researches made to analyse and settle the behaviour at cold plastic deformation of the 2090 alloy used in aeronautical constructions was realized on anneal samples through upsetting, rolling, drawing and torsion methods.*

*The aim of this paper is to analyse and settle the behaviour at cold plastic deformation and the maximum possible degree of deformation, until don't appear cracks, through these four methods presented above for the 2090 alloy.*

*By examination of the results obtained through these methods, it was settled the maximum possible degree of deformation until don't appear cracks and the regression equations which describe the behaviour of the tested alloy to cold plastic deformation.*

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**BENDREA CONSTANTIN , MUNTEANU VIOREL  
THERMAL ANALYSIS OF AN ELASTIC-VISCOPLASTIC  
UNILATERAL CONTACT PROBLEM IN THE CONTINUOUS  
CASTING OF THE STEEL**

**Key words :** Contact, Elastic-Viscoplastic materials, Thermal conduction, Variational inequality, Continuous casting  
**ABSTRACT.** *Mathematical modeling of stress generation and heat transfer in casting processes is adifficult, complex subject that is now receiving increased attention. In this paper, we study a quasistatic problem which describes the frictional contact between an elastic-viscoplastic body (a deformable product of casting process: slab, bloom, billet, round, etc.) and a rigid obstacle (walls of the mold, or, cylindrical rolls system employed for support – traction – soft reduction) in a complicated conditions concerning heat conduction on contact interface in the solidification process.*

*The contact is unilateral assumed and this is modeled by the generalized Signorini conditions for the displacement velocities (the normal compliance condition). The weak formulation of this problem to consist of a variational inequalities for the viscoelasticity and viscoplasticity parts, and, a variational parabolic equation for the heat conduction part.*

*The proof of existence and uniqueness of weak solution to the thermo-mechanical problem are based on arguments involving the monoton operators theory for evolutionary variational inequalities and a fixed point strategy.*

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**MUNTEANU VIOREL, BENDREA CONSTANTIN  
A THERMOELASTIC UNILATERAL CONTACT PROBLEM  
WITH DAMAGE AND WEAR IN SOLIDIFICATION  
PROCESSES MODELING**

**Key words:** Continuous casting, Thermoelastic contact, Damage, Gradient of damage, Friction, Wear, Fretting fatigue, Variational, Inequalities, Discretization method

**Abstract.** *In this paper is presents a coupled thermo-elastic contact problem with tribological processes on the contact interface (friction, wear and damage). The unilateral contact between the cylindrical rolls system and a deformable foudation (slab, bloom, etc) is modeled by the Kuhn-Tucker (normal compliance) conditions, involving damage and wear effect of contact surfaces.*

*The continuum tribological model is based on gradient theory of the damage variable for studying crack initiation in fretting fatigue [18], [24], [25], and the wear is described by Archard's law. The friction law that we consider is a regularization of the Coulomb law.*

*The weak formulation of the quasistatic boundary value problem is described by using the variational principle of virtual power, the principles of thermodynamics and variational inequalities theory. Thus, the main results of existence for weak solution are established using a discretization method and a fixed-point strategy [7].*

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**LEPADATU V. GHEORGHE  
TRANSPARENCY IN FINANCIAL STATEMENTS (IAS/IFRS)**

**Key words:** Financial statements, balance sheet, income statements, cash flow statement, IAS/IFRS

**Abstract :** *The provision of transparent and useful information on market participants and their transaction is essential for an orderly and efficient market, and it is one of the most important preconditions for imposing market discipline. Left to themselves, markets may not generate sufficient levels of disclosure. Market forces would normally balance the marginal benefits and marginal costs of additional information disclosure and the end result may not be what the market participants really need.*

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**LEPADATU V. GHEORGHE , LUMINITA DRAGNE  
THE RELATIONSHIP OF THE ACCOUNTING LAW WITH THE  
MODERN SOCIETY AND THE PRESENT-DAY KNOWLEDGE  
ECONOMY**

**Key words :** *accounting law, globalization, owner's equity, costs, IAS/IFRS*

**ABSTRACT:** *The relevance of the accounting information in the knowledge of the company's patrimonial situation is not only a problem of economic theory, but also of accounting law. Beyond the norms regarding the meaning threshold and the axioms of the economic sciences there appear aspects of contractual nature. The most accurate, systematized and representative data can be obtained only from accounting. The managers and members of the Board will want to obtain by this means as much information as possible, sometimes exceeding the natural capacity of the bookkeeping. For such situations, the accounting law as border discipline will have a word to say.*

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**NATALITA HURDUC, NICOLETA HURDUC  
ECONOMETRIC MODEL PANZAR ROSSE USED TO ASSESS  
COMPETITION ON THE BANKING SYSTEM – CASE STUDY  
CENTRAL AND EASTERN EUROPE**

**Key words:** *concentration, competition, empirical studies, industrial organization, market structure, monopoly, perfect competition, oligopoly, monopolistic market.*

*Classification JEL: G21, L13, L22, L84*

**Abstract:** *The main purpose of this article is to introduce Panzar Rosse model as a viable alternative to determine the type of competition on the commercial banking market. For a better understanding of the econometric model and in order to give an example of the model's results, we have build a case study on 8 banking systems from Central and Eastern Europe. Econometric estimates based on the Panzar and Rosse (1987) methodology suggests that overall, markets have not become less competitive. Lowering barriers to entry, such as allowing increased participation of foreign banks, appears to have prevented a decline in competitive pressures associated with consolidation.*

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