ABSTRACTS "INNOVATIVE TECHNOLOGY" 4 / 2007

TECHNOLOGICAL TRANSFER AND INNOVATION IN AGRICULTURAL MACHINERY DOMAIN

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MAT Craiova is currently one of the biggest companies in Romania, specialized in the production of agricultural and industrial tractors, agricultural machinery, equipments, installations and tools, specifical equipment for the agricultural farms, and also big tractors for construction and land improvement works. Through its competitive product gamma, MAT Craiova is striving to *satisfy the needs of every customer, by offering an excellent price-performance ratio, professionalism of our employees and the servicing provided.*

THE ALTRAN FOUNDATION FOR INNOVATION IS DUE TO LAUNCH ITS 2008 AWARD ON THE THEME: « REDUCING CO_2 LEVELS IN THE ATMOSPHERE: OUR TECHNOLOGICAL CHALLENGE! »

Baptiste Pavy,
Altran Foundation, FRANCE

The Altran Foundation for Innovation launcheds its 2008 Award to get onto the issue of reducing CO_2 concentration in the atmosphere. Today climate warming is accepted as a major issue by the international community and we have no choice but to try and tackle it, and tackle it quickly. During the last century, emissions of greenhouse gases have increased by 50% reaching unprecedented heights. The Altran Foundation has focussed on key issues that have wide ranging effect on everyday lives. This year is no different, and the theme for 2008 is: "Reducing CO_2 levels in the atmosphere: our technological challenge!"
Also, it is presented 2007Altran Foundation Award Laureate on the theme "Mending the human body, through technological innovation". The Award went to the "Artificial Retina"project from Pr. José Sahel, who presented the research theme about an "artificial retina" that enables blind people to partly recover vision.

ORIENTED PRODUCT DEVELOPMENT OVER EQUIPMENTS LIFE CYCLE COSTS

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In order to optimise procurement of production equipment from an economic point of view, in addition to acquisition cost, the procurement decision must also take into consideration such costs and – where performance of the production equipment varies – yields which result from the various life cycles of the investment good. The necessity of taking life cycle costs into account in the development of new machines and systems by the manufacturer becomes all the more urgent, the more customers make their procurement decisions on the basis of an LCC from the manufacturer. The goals of this paper are, on the one hand, supporting the operator in making a selection between various and on other hand for manufacturers provides a methodical framework for the development of innovative configurations of production equipment against the background of life cycle costs calculation.

RESEARCHES CONCERNING MODELLING AND SIMULATION OF NANOFINISHING OF COMPLEX SURFACES, USING ABRASIVE FLOW WITH RHEOPECTICS MEDIUMS

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This paper presents a new integrator concept about nanoprocessing AFM, specially nanofinishing, using nanomaterials medium and using technologies and equipment for nanofinishing complex surfaces with rheopectics mediums.

ESTABLISHING ASSEMBLING TYPE

BETWEEN THE BODIES FROM METALLIC CARBIDES AND THE TAMPING TOOLS

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The researches regarding to the utilization of some assembling types of the bodies from metallic carbides to the active part (tine) of the tamping tools have as the main purpose the establishing of some adequate assembling type which are lead to a very good mechanical properties and in the end to increasing the lastingness of the active part of the tamping tools.

THE HARD PASTE ASSEMBLING BETWEEN THE BODIES FROM METALLIC CARBIDES AND THE TAMPING TOOLS

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By the quality of the paste assembling between the bodies from metallic carbides and the active part (the tine) of the tamping tool, and also the geometry of these depend very much the behavior in exploitation in a good / optimal conditions of the tamping tools and, in consequence the lastingness of these. That why it must to accord a special attention to the paste operation of the bodies from metallic carbides in a very good conditions.

THE ANALYSIS OF MECHANO-ELASTIC AND ELECTRIC CHARACTERISTICS OF ECOLOGICAL QUATERNARY ALLOYS

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The values of the mechanic-electric characteristics of the special ecological quaternary alloys of type CuNiSiMn and CuNi4AlSi are placed at the inferior limit of the classic bronzes with beryllium. The values of the mechanic-elastic characteristics of the replacing alloys can be increased by mechanical hardening without influencing the value of the electric conductivity. The determination of the elasticity modulus E depending on temperature of the special ecological quaternary alloys has been performed using the non-conventional method of mechanic oscillations resonance. The present work studies the elasticity modulus E and the electric conductivity of the ecological quaternary alloys.

OPTIMIZING AND STURDINESS STUDY FOR ELECTROSTATICAL SEPARATION PROCESSUS

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Electrical and electronical equipments (EEE) and their wastes (DEEE) are liquidated, at European level, by the 2002/96/EC and 2002/95/EC reglementations, which main purpose is to reduce the disposed waste quantity. This paper intends to present a modern technology, which is used in electric and electronic equipments wastes recycling industry, according to their specific particularities. The final purpose of the paper is the realization of a robustness study for the electrostatical separation processus, in order to optimize the technological parameters.

SPLIT SPHERICAL ROLLER BEARINGS – AN ECOLOGICAL SOLUTION FOR REDUCING THE COSTS

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With new constructions split spherical roller bearings help in many cases to save considerable cost since they simplify the assembly and facilitate mounting.With this type of bearings, the downtimes of machines and plants is reduced and thus the production cost as well. Although the split bearing variant is more expensive than unsplit bearing variant, refering to total costs witch contain current activities with maintenance and roller replacement, is distinctly advantageous then unsplit bearing variant.

RESEARCHES CONCERNING WORK MEDIUMS PERFORMANCE FOR ABRAZIVE FLOW NANO-FINISHING WITH REOPECTIC MEDIUMS

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The nano-finishing technologies for complex surfaces is an integral concept which uses concentrated energy sources and fluid mediums with reopectic properties, fluids which have in there dispersion abrasive materials. The realization of this kind of fluids requires the obtaining of abrasive grains with specific dimensions, in the nano- area, with properties and technical characteristics required by the abrasive flow finishing process with reopectic work mediums.

ROBOTIZED SUPERFLEXIBLE SYSTEMS – NEW CONCEPTS

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The new superflexibility concept of a robotized system represents a high level in the industrial robots applying. This fact allows a special impact to the robots users and producers. The paper presents some aspects regarding a high flexibility robotized system for applications in some technological processes for small - scale productions. This system suppose a correlation between the new requirements, which are imposed by the high flexibility, both on the robot's structure and programming and on the robotized system components.

ASPECTS CONCERNING THE WORKING OF AN EXPERIMENTAL INSTALLATION BASED ON THE ENERGETICAL SEPARATION EFFECT FOR A TURBULENCE CURRENT OF AIR

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This paper presents the results got with an experimetal installation using a vortex tube to freeze or heat a precinct. The installation, having small sites and weight, was tested in laboratory conditions in order to see what parameters can be got. The paper presents the results obtained.

MODULAR CONCEPTION FOR MACHINE-BUILDING DOMAIN

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The paper refers to the necesity of a systemic approach, scientifically validated from the technical and economical point of view, regarding to the flexible components of the equipment and manufacturing systems. The purpose of the paper is to analyse the modulating degree of the main parts from machine tools, in order to develop new function and to explore their characterisitcs. New solutions of modulating structures are offered, with high adaptability performances.

POWER LOSSES ESTIMATION IN PRECESSIONAL GEAR

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The planetary precessional transmissions represent a new principled type of the mechanical transmission. The specific of the relative sphere-spatial movement of the precessional gearing elements makes the sliding friction to persist. The study of the contact between two working surfaces of one gearing is very important, because the duration of the gearing running, its reliability and efficiency depend on the materials behavior, from which are produced the prehension elements. The study of the contact in the kinematical precessional gearing has a major importance, because in the kinematical precessional gearing there is present the slipping friction, which leads to big power losses and to a big heat elimination in the contact zone.

VIBRATIONS DIAGNOSIS SERVICE FOR MACHINES AND INDUSTRIAL EQUIPMENTS, OFFERT FOR SME's SUPPORT

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This paper presents the achievements of National Research Centre for Technological Systems Performances CNCPST-Optimum,which offers to SME's an innovating service for the diagnosis of the technical estate of machines and industrial equipments, based on the vibrations and noise analysis.

NEW APPROACHES REGARDING THE CREATION OF VIRTUAL ENTERPRISES IN THE NATIONAL NETWORK

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The paper presents a new concept of Virtual Enterprises (V.E.) in a complex approach as a regional network of economic entities as potential constitutes of a V.E. That make possible creation of a data base of technological, collaborative and behaviorist attributes allowing a selection process by clustering in the attribute space potential selections of V.E. groups able to produce the goal product.
The attributes classification is a good support to reengineering works, inside the network entities, to achieve organizational need imposed by the V.E. participation.

ASPECTS CONCERNING THE INTELLIGENT VIRTUAL PRODUCTION OF HIGH RISK PROCESSUS FROM MACHINE BUILING INDUSTRY FOR THE VULNERABILITY DIMINUTION AND COMBATING THE INDUSTRIAL CRASHES CONSEQUENCES

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This paper reffers to the aspects regarding the new integrator concept which answers to the industrial security requirements and assures the sure approach of the work processes in hard conditions in order to descrease the vulnerability and combat the industrial accidentes' risk.
The regarded work processes are the ones with haigh risk level, which require special work enclosures and/or equipments: sandblasting / shot-peening, welding, thermic cutting, covering and painting. These aspects are on the base of some technological models developments for high risk processes, which will be able to integrate equipments, processes, robots, work parts, with aid of specific sensorisation and of monitoring and inspecting cameras integrated in a multifunctional modulated specialized enclosure.

THE BEHAVIOR OF THE PISTON-CYLINDER TRIBOSYSTEMS

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The paper presents researches concerning the functioning and the reliability of certain types of machines and mechanisms as internal-combustion engines, hydraulic machines and devices, compressors and others, which is mostly determined by the functioning of the piston-cylinder assembly. Having diverse specific constructive forms the piston-cylinder assembly is executing more than one function (sealing the workspace of the cylinder, effective load transmission, transport of material, movement guiding, etc.) which determines the large diversity and complexity of the work conditions. Taking into account the type and the laws of relative movement, the diversity of the contact forms and the work conditions, the friction couple of this assembly must be examined and analyzed as distinct systems in the context of systemic analysis and modeling.

WEAR BEHAVIOUR OF ALUMINA AND AISI 52100 STEEL AGAINST MOLYBDENIUM BORIDE COATED AISI D2 STEEL

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In the present study, the tribological behaviour of Alumina and AISI 52100 steel were investigated. Wear tests were carried out under atmospheric conditions and using ball-on disc tribometer. Molybdenum boride coated AISI D2 Steel was used as counterface surface. Molybdenum boride was realized on AISI D2 steel by thermo-reactive deposition technique. The phases formed on the coated steel were MoB, Mo_2B, FeMo and FeB. Wear tests conditions were 2 and 5N loads and sliding speeds of 0.1, 0.3 and 0.5 m/s. The results showed that the coefficient of friction decreases with the increase in sliding speed while there is a drop in wear rate with the increasing sliding speed. The results also showed that the coefficient of friction of AISI 52100 steel and alumina were ranging between 0.296 – 0.622 and 0.474 – 0.908 respectively. Wear rates of AISI 52100 steel and alumina were ranging between $2.27x10^{-8}$ – $3.39x10^{-9}$ and $2.344x10^{-9}$ – $3.94x10^{-11}$ mm^3/m respectively.

ELASTO-HYDRODYNAMIC LUBRICATION ANALYSIS OF PARTIAL ARC BEARINGS USING CFD & FSI

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For the theoretical calculations of the pressure distribution and, in turn, of the performance characteristics of the partial arc bearing system, it is necessary to know accurately the fluid film geometry. Since, in practice, the runner and the bearing shell are elastic and deform under hydrodynamic pressure, the correct film geometry cannot be established without taking into account elastic deformations. The journal material is more rigid than the bearing shell material, so the deformation of the journal surface can be neglected. In the present analysis, the modified film geometry is obtained by including the deformation in the bearing and its effect on the performance characteristics of a partial arc bearing is studied.

This paper presents the overall Elasto-hydrodynamic Lubrication(EHL) analysis of a Externally adjustable Single 60° partial arc bearing with different tilts and different radial adjustments using the sequential application of Computational Fluid Dynamics(CFD) and Computational Structural Dynamics(CSD). Here the coupled field analysis uses the capabilities of commercially available Finite Element Software ANSYS/FLOTRAN and the technique of Fluid Structure Interaction (FSI).

The pressure field has been obtained considering the laminar flow regime using CFD. Stress distribution and deformation in the pad due to resulting pressure force is obtained using FEM, satisfying the boundary conditions. The stress distribution indicates the critical points in the pad. ANSYS/FLOTRAN is applied to simulate the pressure field and calculate the static characteristics of a Single 60° partial arc bearing for various eccentricity ratios and length to diameter (L/D) ratios. The results show reasonable agreement in general.