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COMPARATIVE STUDY REGARDING THE TAMPING MACHINE

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The modern technological process for building, maintenance and reparation of the railway, besides to other technical operations, must include some of the most important technical operations like tamping, leveling and directing of a railway. All these technical operation by tamping, leveling and directing of a railway are made in present by a single railway machine, which is known like tamping machine. In the world are many producers by tamping machine, some of the most important of them being in Romania through their types of tamping machines.

COMPARATIVE STUDY REGARDING THE TAMPING TOOLS

Sorin George Badea, Cristinel Beşleagă

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The exploitation of tamping tools is done so that each tamping tool can be mounted on a single tamping machine type, the interchangeability degree being limited mainly due to the size and different dimensions of the tamping tools grip, also due to the different way of grip, and fixing on the port tool. Managing different types of tamping tools, specific to each tamping machine, imply a lot of obstacles and costs.

ABRASIVES RHEOPECTICS MATERIALS FOR NANOFINISHING BY STRENGTH ABRASIVES

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This paper presents an introduction to the field of nanofinishing with abrasives. This is an unconventional technology, a very effective method in terms of ecological process known as the Strength Abrasives Process (AFM). Equipment designed by ICTCM is an universal machine tool, which is composed by two cylinders, in order to extrude the abrasive environment through passages crossing (channels) and finishing areas and edges. Extrusion pressure is in the range 700 - 22,000 kPa, with the flow rate of more than 380 l / min. There is also a system of control of process parameters, parameters such as temperature, viscosity, flow rate of abrasive environment, etc.

The abrasive environment is a great importance reopectic medium, for the obtaining of an efficient nanofinishing technology. That one has two main components: a viscous fluid, which contains several components such as lubricants, anti-corrosive agents and emulsions, and an abrasive substance. The nature, the viscosity, particle sizes and concentration of abrasive material are essential for the final result of technology. The mixture of all these chemicals and materials allow a broader range of compositions of abrasive material. Many tests have already been prepared at the laboratory, using safe materials and ecological ones and preliminary results are very promising.

SPECIFIC ISSUES ON EQUIPMENT AND PARAMETERS PROCESS OF TECHNOLOGY FOR FRICTION WELDING WITH SWIRL ELEMENT (FSW)

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This paper presents constructive and functional characteristics of specific equipment used in the newest technology of welding: Friction Welding with active rotating - element FSW ("Friction Stir Welding"). In the first part of the paper is submitted the process of friction welding, the specific technological parameters and their usual values, which are published in the literature. There are detailed the constructive characteristics of specific equipments of FSW technology, for the series production and for tests prosecution, produced by international specialized companies. In the second part of the paper are presented the results obtained from the implementation and operational and technological testing, considering the cynematic and dynamic parameters of the process. The end of the paper presents the conclusions reffering on the construction and on the equipment working conditions, as well as on the process of welding FSW.

TECHNICAL PERFORMANCES AND ECOLOGICAL ASPECTS OF MACHINE TOOLS AND INTEGRATED SYSTEMS

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The paper presents current national and international trends in the development of machine tools and integrated systems of machining. It is a common place that ecological aspects related to machine tools operation have always been and will be an issue of great concern. Reaching higher speed limits has always been the general desideratum of specialists working in all industrial domains. The article gives detailed specifications in this domain, when applied to the particular cases or machine tools and integrated systems.

FRAGMENTATION EQUIPMENT OF THE TIMBER IN ORDER TO OBTAIN VEGETAL ECOLOGICAL COMPOST

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The paper presents the research-development activities in order to realize an equipment for breaking-up and crumbling which processes mechanized the wood scraps, resulted of the cleaning/cutting of trees and bushes from the forest areal and parks, in order to obtain the vegetal compost used to develop an ecological agriculture with good (positive) effects on environment, but also used to obtain biomass, which is necessary to produce regenerable fuel, as an unconventional energy resource. This equipment is a bio-shredder used in shredding organic and vegetable waste, with a single feed opening and a single chipping system with grid refining and centrifugal blower for evacuation the products. The fineness of the ground material can be adjusted through a riddle by request. This equipment is an absolute novelty for Romania and it responds to EU requirements concerning the environment protection.

TESTING OF THE FRAGMENTATION EQUIPMENT OF THE TIMBER

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The article presents the experimental research developed after the physical realization of the equipment for breaking-up and crumbling which processes mechanized the wood scraps, in order to check the technical and technological performance to it. Testing equipment was made by using a modern instrumentation, with monitoring and the acquisition of main functional parameters. It shows the technical solutions for the implementation of sensors and transducers on equipment for taking the evolution of the mechanical and hydraulic parameters. It is presented a system for measuring and recording the main functional parameters of the equipment. Finally, it is showed some variation of graphics functional parameters of the equipment, produced in the testing phase of the equipment in the operation conditions.

EQUIPMENT FOR MONITORING WATER QUALITY

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In Romania the irrigated surface with high economic efficiency it is estimated at 3.5 mil. ha. On national scale there is no integrated approach of the quantity and quality values of the irrigation water, and resource, as well as an equipping of the pumping station. On international scale, in the developed

countries the pumping stations are provided with equipment for monitoring, on real time, the quality or the pumped water and for warning about critical situations (emergencies).

The technical solution consists of an equipment which monitors the following parameters: turbidity, pH, CE at 25°C, Na⁺, Cl⁻. The lapse of time for monitoring is of 10 – 60 min. The main components are the following: the prelevation pump (submersible) the monitoring board, the repression pipe of the analysed water. There are made warnings about the exceeding of the programmed level for each monitored parameter, about the fact that the pump and agitator don't work or about any other source of damage.

The testing of the equipment in the ground was made at the base pumping station Manta, from the Danube Meadow, Giurgiu county.

The water is from the Danube and it is in most of the cases mixed with the water originating from drainage mixed with the drainage water.

RESEARCHES ON USE OF RENEWABLE ENERGY SOURCES IN THE MACHINE BUILDING INDUSTRY

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The purpose of analysis for this paper is to support renewable energy sources through the collection of industrial and municipal waste and biogas recovery of such product. Renewable energy sources are the oldest sources of energy used, in various ways. At present the use of renewable energy sources is realized through the application of modern technologies. In this context, the paper proposes a technical-economic analysis for the installation of a group of cogeneration operation with the biogas, needed for the production of electricity and heat.

MODERN TECHNOLOGY OF RADIOACTIVE DECONTAMINATION OF METAL MATERIALS RESULTING FROM THE DECOMMISSIONING OR REPLACEMENT OF THE EQUIPMENT IN NUCLEAR FIELD

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In the following article is presented a new technology for decontamination the metallic materials which come from used radioactive mining facilities. It is

presented the main installation for decontamination, using the impact with abrasive and also, the advantages of this technology.

NEW CONCEPT OF NET-SHAPE COVERING FOR REVOLUTION METALIC PARTS OBTAINED BY ROTATING FORGING

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This new concept is related to the development of a modern technology for net-shape coating of the axisymmetrical metallic parts (spindle and bush type) by cold rotary swaging. The new technology have the purpose to realize parts with basic structure made from cheap materials with high fatigue strength, on which is applied, in that areas where different characteristics (low friction coefficient, high hardness etc.) are required, a layer of expensive materials which provides this characteristics.

THE BIOMASS - A CLEAN AND RENEWABLE FUEL FOR THE ENERGY PRODUCTION IN THE MODERN GASES PLANTS

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Biomass gasification is a complete conversion of biomass in a gas fuel by heating in an optimum medium, air, oxygen, or steam promise to become a basic source of electric energy. Gasification of biomass is a real process for obtain of electric energy in boilers steam turbine, heat engines, gas turbine and argumentatif of harmony for many fuel cells.

MODULAR SYSTEMS FOR MACHINES BUILDINGS

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The paper refers to the modular systems in the machine tools design in the purpose of modulisation improvement of the components and new characteristics development and new functions in order to adapt at new fabrication possibilities, taking in consideration the productivity and quality production improvement.

**ELECTRIC ARC THERMAL SPRAYING
OF CuAl9Fe3 AND CuSn6P ALLOYS,
AN EFFICIENT SOLUTION
TO OBTAIN REQUIRED COATINGS FOR
SLIDER BEARINGS**

Valentin Mihailescu, Gheorghe Badea, Leonard
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The article contains a synthesis of the results from tests on the mentioned alloy. Performed tests are grouped into two categories, namely:

- a) tests that are specific to thermal spray deposition comprising optimal parameters for spraying depending on the pursued aim;*
- b) tests that are specific to the deposition wear behaviour, respectively tribological tests.*

The synthesis of these tests defines the behavior during service of mentioned alloy, therefore its fields of use.

**METHODS AND TOOLS
FOR ENVIRONMENTAL TECHNOLOGIES
AND ECO-DESIGN**

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Innovation in the spirit of eco-efficiency may consist of incremental improvements in processes or products, but also a more radical leap to a new technology. Eco-efficiency (EE), often superimposed the term eco-innovation, is an integral part of the Strategy for Sustainable Development (SDD), targeting mainly the economy, the environment and highlight the inter-relationships between them. But is directly related to the social component in the consumer demands of society.

3D DIMENSIONAL CHAINS

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This project aims to elaborate a methodology to establish spatial dimension chains, with a vectorial and statistic approach. This methodology will be set in an algorithm in order to issue a software product.

A calculation method for dimensional chains treated statistically as vectors, along with a software structure for calculation, will be developed, and the program will be experimented on well-known modules in mechanical engineering-technical drawing and assembly parts – as well as on other technologies-tolerances and machine manufacturing. Regarding the application of the method in technology, the starting point is the well known fact that the processing on specific machine translates in the change of the reference system of the semi-fabricate from the functional–constructive reference system to the reference system of the processing automated tool.

**MATHEMATICAL SIMULATION
FOR THE DEVELOPMENT
OF THE EQUIPMENTS
FOR PROCESSING MODULATION**

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The modernization of the fabrication process of the machine construction domain enforce o reconsideration of the priorities regarding the evolution of the technological system. The elaboration and the utilization of some calculation methods, mathematical models and optimization algorithms have permitted us to develop new modular structures with characteristics and superior performances regarding the precision, productivity and the flexibility of the devices, equipments and other mechanical systems.

**SIMULATION AND EVALUATION METHODS
FOR THE ACCIDENTS DONE
BY THE IGNITION OF HYDRAULIC FLUIDS
IN CONTACT WITH WARM SURFACES**

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The paper presents a study on the causes of fires caused by accidental ignitions of various combustible materials, as well as measures taken to avoid such accidents. Are presented methods of simulation and evaluation of accidents caused by the ignition of hydraulic fluid in contact with hot surfaces and installation done to determine the fluids inflammability in contact with hot surfaces.

**DETERMINATION
OF THE PARAMETERS CORRELATION
FOR THE PROCESS OF ROTATING FORGING
OF TUBULAR PARTS,
USING NUMERICAL MODELLING**

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Although rotary swaging process is used from some time, the correlation between its main parameters remain unknown, the development of applications being done mainly through experimental ways. Experimental researches have the disadvantage of not being able to provide information about significant parameters, such as stresses and strains. In contrast, numerical calculations, like finite element analysis (FEA), provide the opportunity to determine all relevant parameters at moderate cost.

**ASPECTS AND RESULTS
OF THE NUMERICAL SIMULATION
OF THE DEEP-DRAWING OF BUTT-WELDED
PARTS**

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Butt-welded metal sheets have many advantages, such as decreasing the part's weight, reducing the manufacturing costs and an increased dimensional precision. In order to benefit from these advantages, a detailed knowledge of this kind of sheet's behaviour during deep-drawing is necessary. The current paper aims to analyse the analytical model of deep-drawing a blank realized through the butt-welding of two metal sheets. A comparison between the deep-drawing of such kind of blank and the deep-drawing of a conventional blank is also discussed.

**STATIC BEHAVIOUR OF AN ADVANCED
ULTRA-LIGHT SANDWICH COMPOSITE
STRUCTURE FOR A WHEEL CHAIR**

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A theoretical approach of an ultra lightweight sandwich composite structure with extreme rigidity is presented. The structure features two carbon/epoxy skins

reinforced with twill weave fabric, and an expanded polystyrene (EPS) core. The structure is subjected to a biaxial field of normal loads combined with a shear load. An equivalent model of this structure is presented. It has been accomplished a comparison between this structure and a similar one with glass/epoxy skins reinforced with EWR-300 fabric. Sandwich structure's strains, stresses, skins plies' strains and a comparison between the rigidities of the structure's components are presented. A theoretical approach regarding the bending of the structure is also shown.

**ON THE PRE-TENSIONING TECHNIQUE
OF PMC-TUBES FOR A ULTRALIGHT
WHEEL CHAIR WITH APPLICATIONS
IN THE MEDICAL TECHNIQUE**

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The paper presents an original method to increase the loading capability of PMC (polymer matrix composite) tubes used for ultralight wheel chair for persons with locomotors disabilities. The method involves the introduction of supplementary internal stresses in thin-walls cylinders with only a few wound layers. An original device has been developed to attain this end. Various tube specimens with different disposal of reinforced material were carried out. The specimens have been heated at a proper temperature and then an elastic material was pressed at the inner of the tubes. While keeping the internal pressure, the specimens were cooled and then discharged. Then, the pre-tensioned specimens were subjected to internal pressure until weeping occurs. Using this method of pre-tension, the loading capability of PMC-tubes is increased up to 43%. A theoretical approach regarding the cross-ply and balanced angle-ply composite tubes is presented.

**THE SIMULATION OF THE LOADINGS
APPEARED IN THE TIME
OF PROCESSING THROUGH
THE FINITE ELEMENT METHOD
FOR SOME OF THE COMPONENTS
OF AN ADJUSTABLE MODULAR
SYSTEM OF TOOLS GUIDANCE**

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The modular elements devices are more and more used within flexible production. The use of simulation by the finite element method allows settling the processing accuracy of such equipments since the designing level. This paper presents the main stages in simulating the behaviour of an adjustable modular system of tools guidance in processing holes and the influence of the system configuration, of the processed material and of the diameter of the hole over the strain of the slip bushing. The limits of the processing accuracy are shown, ensured by two configuration of the guiding unit of the tool.

**MATHEMATICAL MODELLING
AND ANALYSIS OF RESIDUAL STRESS
IN FILMS BONDED BY TERMICAL
SPRAYING, USING THE FINITE ELEMENT
METHOD AND ALGOR SOFTWARE
PACKAGE FACILITIES**

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The topic that the project aims to achieve is an original approach regarding the remanent tensions in the coatings obtained by thermal spraying, at the level of the sprayed particle, using the finite element method and the facilities of the program package ALGOR for mathematical modelling.

**ASSURANCE IN FINANCIAL REPORTING,
NEW INSTRUMENTS FOR A BETTER
INFORMED MANAGER**

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This paper aims to improve the quality of managers' decisions due to better financial reporting, to find tools to enhance financial reporting and assurance processes, in order to reduce skepticism of all range of financial data users. The paper describes some of the benefits and opportunities in relation to the use of XBRL, as it exists today and suggests extension under Romanian accounting law.

**TECHNOLOGICAL CHALLENGES
IN ROMANIAN OIL MARKET**

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This paper aims to define the place of a bio-refinery into the Romanian economic system, presenting both the industrial crops considered by the authors to be the most recommended to obtain biofuels, and, synthetically the technology used in this area. Also, by estimating the potential market in this field there is pointed out the possibility to develop a new competitive advantage for certain regions of Romania, if the integration of the new products is undertaken according to marketing and quality concepts.

**MODERN APPROACHES
ON THE RELATIONSHIP BETWEEN SIZE
COMPANIES AND THE CONTENT
OF HUMAN RESOURCE MANAGEMENT**

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Thoroughful and systemic approach upon MRU in SME's it's a relatively new phenomena. Research and studies carried in SME's point to the fact that the firm size, the informality of the structure and of the processes on one side, and the attitude and values of the owner-manager, have a significant impact upon the ways to adopt RU practices.

CLUSTERS - PROSPERITY GENERATOR UNITS IN ROMANIAN MANUFACTURING

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This article plans to offer a methodological and pragmatic base for those interested to establish clusters in all regions of Romania. It is addressed mainly: SMEs, local public administration, research community (research institutes, universities), financial institutions, institutions of cooperation (chambers of commerce, organizations of business, etc.).

“INNOVATION ROMANIA”CENTERS NETWORK. NATIONAL NETWORK OF INFORMING CENTERS AND ASSISTANCE IN RESEARCH -DEVELOPMENT - INNOVATION AND TECHNICAL TRANSFER “INFOAS” PROJECT – PNCDI/Modul 1

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Since 1992 (PHARE Program for Restructuring the System Science and Technology in Romania-phase 1) and continuing 1996 (PHARE Program for Restructuring the System Science and Technology in Romania-phase 2) and the framework programs, the European Commission has made efforts to Romania in implementing a system for Research – Development - Innovation and TT consistent and compatible with the European system.

The European Commission has succeeded in co-financed projects to support the construction of the system only to a certain level. Non-finality of this system has led a Romanian non- efficiency of the Romanian research, in particular and a low efficiency of Romanian economic system, in general.

Efforts in recent years of the National Authority for Scientific Research Program, using INFRATECProgram, have not managed to solve the problem of the system definitization, only supplement it.

We believe that all the steps and achievements of the European Commission and the National Authority for Scientific Research have been correct and necessary, but something is missing – the interested parts of the system, which are directly interested in Romania’s achievement of a sustainable economy, based on knowledge, of an economy based on development.

ECONOMICS CONCEPTS APPLIED IN THE COMPETITIVE PRODUCTS DEVELOPMENT

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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. This paper is presents the costs basics regarding the technical decisions of products innovations. In the efficient selling of new innovative products, the main issue is marketing of innovation. The economical fundamentals of the technical decisions must be a part of the product development cycle and represents the key of success when the product is promoted and sold on the market. Therefore, this is possible using the analysis of added value method applied on product development. This analysis aims for design and costs of product functions to be done with minimal effort but they must fulfil the client’s needs and must have a low ecological impact.

LIFE CYCLE – BETWEEN PRODUCT AND ITS IMPACT OVER ENVIRONMENT AGENTS

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In the activity of a firm, the environment plays an essential role in defining its strategies, using the development opportunities, forming the realizing support objectives for economic increase, profitability or only surviving.

In the opinion of Phillip Kotler, the product, named “global” can be defined as being “the assembly of the external enterprise’s forces and factors that are able to affect the product’s development manner”.

The PRODUCT is the material result within a system concept, addressed to satisfy a need and represents a sum of material and immaterial components and independent features that form a total unit.

The product brought on the market has to be tackled within a system concept, that englobes the good’s material substance and also an outside component, it

has to be tackled from different points of view, framing the following conceptions:

- 1. The integrating conception towards the product concerns the product as a complex system of material and immaterial components.*
- 2. The valuable conception*
- 3. The functional conception*
- 4. The conception that regards the changing status on the market.*

RESEARCHES CONCERNING APPLICATION OF LIFE CYCLE ASSESSMENT TO PROCESS INDUSTRY PRODUCTS

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The paper presents the concept of lifecycle product and considerations about Life Cycle Assesment. The author emphasizes some applications of life cycle assessment to process industry products. Today's market prompts customers, decision makers and investors to become more and more interested in environment protection, in sustainability - to assure a good impact of the business on the environment.

BIO-CHEM DECONTAMINANTS BASED ON THE OXIDANT COMPOUNDS AND AMMONIUM QUATERNARY SALTS

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A series of substances recommended as biological and chemical decontamination agents and new synthesized substances were tested. The substances are characterized by a high chemical stability. The products are soluble in water and in different organic solvents. It is a universal biocide with bactericide, fungicide effects with multiple uses. These substances are characterized through a low toxicity for mammals and human subjects.