

**ANNUAL SCIENTIFIC JOURNAL OF OVIDIUS UNIVERSITY - MECHANICAL  
ENGINEERING SERIES**

**ANALELE UNIVERSITĂȚII OVIDIUS CONSTANȚA – SERIA INGINERIE  
MECANICA**

**VOLUME XI, NUMBER 1, 2009**

**CONTENTS:**

**1. TOLERANCING WITH PARAMETRIC COMPUTER AIDED DESIGN TOOLS**

Valentina M. POMAZAN<sup>a</sup>, Lucian C. PETCU<sup>a</sup>, Vladimir YORDANOV<sup>b</sup>

<sup>a</sup> *The Ovidius University of Constanța, Romania,* <sup>b</sup> *Technical University of Varna, Bulgaria*

**Abstract.** The paper presents the tolerancing issues in assembly design. The mathematical precision of the part description makes the part easier to manufacture and inspect and offers the ability to define a part in a manner that protects the part function and allows maximum tolerances for manufacturing. The tolerance analysis is needed to learn the effects of a group of tolerances on one another and on a object. Worst case, statistical and process tolerancing are overviewed from the point of view of manufacturing and costs. Design flow scheme with tolerance analysis is proposed and basic tolerancing problem approached with Autodesk Inventor is presented.

**Keywords:** Tolerances, manufacturing process, mechanical design.

**2. PRODUCT DESIGN FOR MANUFACTURING**

Valentina M. POMAZAN, *Ovidius University of Constanța, Romania*

**Abstract.** The paper presents the basic principles to design products that are manufacturable and overviews the development of low-cost, high quality products that satisfy the customer needs by design. The issues of the design for manufacturability are defined and ways to use concurrent engineering to develop products following specific phases are shown. Design for manufacturing (DFM) implementation principles are summarized.

**Keywords:** design, manufacturing, concurrent engineering, product development.

**3. INNOVATION METHODS IN STRUCTURES OF PRODUCTION SYSTEMS DESIGNING**

Vladimir RUDY, *Technical University of Košice, Mechanical Engineering Faculty, Letná 9, 042 00Kosice, Slovak Republic*

**Abstract.** Technological design is one of basic activities in process of preparation of innovation, modernization or reconstruction of production. Technological project represents the first model of structure of the future production, which enables to simulate realization of the future production process including its economic implications. Technological design represents a system of activities related to analyses, planning, design and visualization of new realized, enlarged, reconstructed and modernized production plants or their parts.

**Keywords:** Modeling, Design of Manufacturing Systems, Modernization of Production

#### 4. ANTICIPATION OF CUTTING SURFACE QUALITY FROM PRE-SET CAM PARAMETERS

Michal FABIAN<sup>a</sup>, Emil SPIŠÁK<sup>b</sup>, Jaroslav ŠEMINSKÝ<sup>c</sup> and Miroslav DOVICA<sup>c</sup>

<sup>a</sup> *Computing Centre, Mechanical Engineering Faculty of Technical University of Košice, Slovak Republic*

<sup>b</sup> *Department of Technologies and Materials, Mechanical Engineering Faculty of Technical University of Košice, Košice, Slovak Republic*

<sup>c</sup> *Department of Biomedical Engineering, Automation and Measurement, Mechanical Engineering Faculty of Technical University of Košice, Košice, Slovak Republic*

**Abstract:** CAD system using allows realising of quality surface and shape requirements required by users and technology more easily. On the other side the parameters of copying accuracy of plane by cutter have some influence to number of lines of programme, operation time and to quality of surface too. Optimisation of these parameters is important, as we need to minimize operation time and to achieve required quality of surface. Exact and optimal specification of CAM parameters with reference to surface roughness and effectively of economic cost is possible by means of computer simulation of manufacturing. This paper deals with quality of surface made by manufacturing of concave and convex surface that are used as radius transition between planes.

**Keywords:** Flexible manufacturing system (FMS), Computer aided design (CAD), Computer aided manufacturing (CAM).

#### 5. TESTS IN WIND TUNNEL, FOR AN AXIAL CASCADE PROFILE

Vergil CHIȚAC<sup>a</sup>, Ionel BACIU<sup>b</sup>, Victor BĂLĂȘOIU<sup>b</sup>, Ilarie BĂDĂRĂU<sup>b</sup>

<sup>a</sup> *“Mircea cel Bătrân” Naval Academy, Constanța*

<sup>b</sup> *POLITEHNICA University, Timișoara*

**Abstract.** In this paper, we deal with a small part of the experimental attempts over an axial network of reversible profiles, NACA in S. The experiments were made in the aerodynamic tunnel of the Hydraulic Machines Department in Timisoara. In the first part, our goal is to present the aerodynamic tunnel planned for the testing of the singular profiles and adapted for testing the axial networks of the profiles. The paper also presents part of the experimental results obtained after testing the axial network of the profiles, in direct current. The experimental results are shown in the graphics.

**Keywords:** aerodynamic profiles, aerodynamic tunnels, layer, turbulence, pressure

#### 6. A METHODE FOR CALCULATING OF THE CHARACATERISTIC CURVES OF CAVITATIONAL EROSION

Vergil CHIȚAC<sup>a</sup>, Ilare BORDEAȘU<sup>b</sup>, Ionel BACIU<sup>b</sup>, Victor BĂLĂȘOIU<sup>b</sup>, Rodica BĂDĂRĂU<sup>b</sup>

<sup>a</sup> *“Mircea cel Bătrân” Naval Academy, Constanța*

<sup>b</sup> *POLITEHNICA University, Timișoara*

**Abstract.** In this paper we present a new method of obtaining the characteristic curves of cavitation erosion: the cumulated cavitationaly eroded mass depending on time  $m(t)$  and the cavitational erosion speed depending on time  $v(t)$ . For determining the coefficients being part of the analytic function  $m(t)$  and  $v(t)$  the method of least squares was used taking into consideration the experimental results obtained for the I-RNR carbon naval steel [2], as well as Mac Laurin series development and then a rectifying of these was made.

**Keywords:** cavitation, erosion, hydraulic machines, naval steel

## 7. HUMIDITY INFLUENCE ON A HEATING VALUE OF A WOOD - BASED FUEL

Miroslav RIMÁR<sup>a</sup> –Peter BALICKÝ<sup>b</sup>

<sup>a</sup>*Faculty of Manufacturing Technologies of the Technical University in Košice with the seat in Prešov, Bayerova 1, 080 01 Prešov, Slovakia*

<sup>b</sup>*Gasmonta s.r.o., Herlianska 1070, 09309 Vranov n. Topľou, Slovakia*

**Abstract.** The paper deals with wood mass burning. It analyses a humidity influence on a fuel heating value. Humidity contained in a fuel reduces its heating value and due to a reduced fuel heating value, the effectiveness of a boiler is lowered as well. The results presented in the paper are supported by stoichiometric calculations which are based on humidity measuring of individual fuel samples.

**Keywords:** woody mass heating value, humidity, effectiveness of a boiler

## 8. STUDIES CONCERNING THE INFLUENCE OF THE THERMO-MECHANICAL TREATMENTS ON THE MECHANICAL PROPERTIES OF THE STEEL WELDING JOINT 5NICR180

Melat BORMAMBET, Gabriela IANCULESCU

*Ovidius University of Constanța, Constanța, 8700, Romania*

**Abstract.** In the paper are presented the results of the tests obtained after the application of the thermo-mechanical treatments over the welded tests through the MMA (metal-manual-arc) procedure. There have been effectuated two types of tests, one welded test through the MMA procedure which has been subjected to do a thermo-mechanical treatment and water cooling after the treating (test 3.1.1) and a welded joint through the MMA procedure which has been subjected to do a thermo-mechanical treatment and air cooling (test 3.1.2). All the tests have as a base material the 5NiCr180 steel that is an austenitic stainless steel with cryogenic properties. After the metallography analysis and the hardness and the tenacity tests, over the heat treating tests has been obtained abatement of the grain, a raise of the hardness feature, without affecting the tenacity properties for test 3.1.1.

**Keywords:** thermo-mechanical treatment, cryogenic properties, welded test

## 9. EXPERIMENTAL RESEARCHES CONCERNING FRICTION-WELDED JOINTS ALTER VACUUM QUENCHING HEAT-TREATMENT, MADE BY 20VNIMOCR120 STEEL

Gabriela IANCULESCU<sup>a</sup>,\* Melat BORMAMBET<sup>a</sup>

<sup>a</sup>*Mechanical, Industrial and Maritime Engineering Faculty, Ovidius University of Constanta, 900527, Romania*

**Abstract.** The paper represents experimental research on friction-welding joints made by 20VNiMoCr120 steel, after vacuum quenching heat-treatment and tempering at 750°C temperatures. Steel and friction-welded joints structures have been studied, but the quality control of these joints has been made using mechanical tests as heat-test tension (at 350°, 450°C, 550°C temperatures) and hardness test.

**Keywords:** friction-welding procedure, vacuum quenching, tempering, macro and microscopic analyses.

## 10. THE LOADING UNITS AND INTERMODAL TRANSPORT

Violeta POPESCU, Hazel MENADIL

*Ovidius University of Constanta, 124 Mamaia Ave., Constanta, Romania*

**Abstract:** The modern international transport is characterized by intermodalism. The intermodal transport aims at achieving an integrated transfer chain of goods between the sender and the receiver, which responds the production

needs and has as purpose accelerating the goods distribution by means of reducing the capital included in goods excessive stocks, useless transport, the delays caused by the ships movements in port, etc. it is a developed transport, at which all means of transport compete with the view of reducing the time and the transport costs.

It relies on the ISO containers, mobile cases, containerized means of transport, manipulating and ILU transshipment technologies, logistics and information technology. Among other impediments in achieving the intermodal transport, the ILU transshipment between the modes remains complicated, slow and expensive, due to their dimensions diversity and to the corresponding manipulation devices. That is the reason why the necessity of using a single ILU is felt more and more.

*Keywords:* container, intermodal transport, intermodal transport unit

## **11. THE ENVIRONMENT MANAGEMENT IN PORT OPERATING ACTIVITY**

Hazel MENADIL, Violeta POPESCU

*Ovidius University of Constanta, 124 Mamaia Ave., Constanta, Romania*

**Abstract:** The threatenings on the environment represent a main component of the national and international security. At the same time we can say that the environment security is inevitably worldwide and it does not have only the national character as the threatenings on the environment affect the whole mankind and necessitate coordinate actions.

Thinning of the ozone stratum in the atmosphere owing to the accumulation of some chemical substances created by man could have a serious impact on people's health and food. Unless some measures of reducing the substance quantity are taken that destroy the ozone stratum, these will increase about six times till 2020. Doubling the concentration of carbon dioxide and of other gases that accumulate heat in the atmosphere could result in increasing the earth average temperature by approximately 1,5 – 4,5°C. Such a temperature growth could lead to the sea level rise by 30 – 40cm, which may have evil consequences for the whole mankind.

This paper aims at presenting the components of the environment management, the informational fluxes in the environment management, the performance standards in the environment management and the way that has to be chosen to intervene in case of pollution in the port operation activity.

*Keywords:* pollution, port activity, eco-audit, environment management

## **12. THE EVALUATION OF THE HUMAN RESOURCES SKILLS WITHIN INDUSTRIAL SYSTEMS**

Luminița GEORGESCU<sup>a</sup>, Constantin ISPAS<sup>a</sup>

*<sup>a</sup> University POLITEHNICA of Bucharest, 36 Splaiul Independentei Str., Bucharest, Romania*

**Abstract:** The present survey analyzes the level of accomplishment of certain competences during five years period of higher education. The survey has been made on representative sample students attending the Industrial Economical Engineering programme of University POLITEHNICA of Bucharest, IMST faculty. It aims to emphasise the degree in which the educational engineering system is able to adapt to the rhythm of changes taking place on the work market.

*Keywords:* Evaluation, formation, skill, competence, development.

## **13. ANALYSIS METHOD OF ENERGY CONSUMPTION IN ACADEMIC ESTABLISHMENTS**

Feiza MEMET<sup>a</sup>, Osman Kamil SAG<sup>b</sup>

*<sup>a</sup>Constanta Maritime University/Romania*

*<sup>b</sup>Piri Reis University/Istanbul-Turkey*

**Abstract.** Activities in higher-education buildings have an impact on the environment. This paper focus on academic establishments having in view that students are able to facilitate the dissemination of this kind of energy

savings. Are presented energy consumption indexes specific to this type of buildings. Their values indicate if a building with educational activities is an energy efficient one. It is shown that cogeneration offers earning opportunities in the energy area, but also in economical and environmental. Presented methodology will help Rectors to analyse the possibility to install a cogeneration plant in their universities.

*Keywords:* building, cogeneration, energy, consumption, analysis

#### **14. METHODOLOGY AND THEORETICAL ASPECTS REGARDING THE EVALUATION OF THE ORGANIZATIONS CAPABILITY**

Cristian Vasile DOICIN<sup>a</sup>, Ioan MATEESCU<sup>a</sup>, Lucia Violeta MELNIC<sup>b</sup>

<sup>a</sup> *POLITEHNICA University of Bucharest, 36 Splaiul Independentei Str., Bucharest, Romania*

<sup>b</sup> *Ovidius University of Constanta, 124 Mamaia Ave., Constanta, Romania*

**Abstract:** The process of evaluating a new strategic project supposes the establishing of technical and economical capability of the production system which will integrate it. In order to establish the capability of a production system, an original methodology was developed [4].

The paper presents theoretical research regarding evaluation methods applied to the integrated production systems and a general methodology for evaluating the capability of these systems. The methodology imposes, on one hand, rigorously in respecting the evaluation principles and stages, and, on the other hand, a large adaptability in using the specific managerial and informatics tools.

Finally, it may be used in a various way of applications regarding the integration of the production systems within the environment.

*Keywords:* capability, evaluation, methodology, production system.