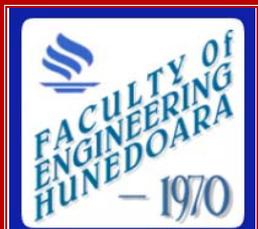


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**TOME I  
[2008]**



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***– Bulletin of Engineering***

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**FROM THE RETEZAT NATIONAL PARK TO EUROPE'S "YELLOWSTONE" – SEEDS FOR THOUGHTS ON THE ESTABLISHMENT AND EFFICIENT MANAGEMENT OF EUROPE'S LARGEST PROTECTED AREA COVERING THE SOUTHERN AND WESTERN CARPATHIANS IN ROMANIA AND SERBIA**

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**Abstract:**

*The Carpathian Mountains and the Danube Delta are key biodiversity and wilderness hotspots of Romania and, indeed, for Europe. Large areas of forests in the Carpathians and extended wetland areas are places where wildlife can find a refuge and where people longing for solitude and beauty can enjoy them. Where are these places and what should we do to keep them? The proposal launched in this paper comes with the intent to convince that it is not too late to maintain the Carpathians and, even if we can not maintain the entire mountain range in its present status, there are some key areas that are already protected to certain extent and can become the largest protected area of Europe.*

**2. MARIUS CĂLIN BENEĂ**

**INTERNAL MARKETING AND PERFORMANCE IN SERVICES ORGANIZATIONS**

25

**Abstract:**

*The paper tries to reveal the critical importance of service employees and human resource in delivery of quality services and creating customer satisfaction. We consider that the employees' abilities (attitudes and behavior) can improve - or reduce- the reputation of services organization (employees are responsible for the organizational performance). Internal marketing is the vision of a services organization that wants to transform its employees in loyal customers. By satisfying „internal customers”, the organization improves its ability of satisfying the „external customers” successfully.*

*Internal marketing is a concept aimed at developing customer conscious employees that will consistently deliver superior quality service to the external marketplace. For the purpose of this paper the group will focus on the customer orientation perspective as it is relevant in the context of high contact service employees.*

*In the context of customer orientation internal marketing considers the attraction, retention and motivation of service-minded employees. Internal marketing is a technique implemented by the organization in an attempt to ensure the provision of excellent service.*

*This paper focuses on the fact that the services organization's performance is fundamentally based on the way managers lead – using their creativity, imagination, competence – the employees.*

3. AMALIA ANA DASCĂL

**STUDY ON THE VARIATION OF CONVENTIONAL FLOW LIMIT DEPENDING ON THE MAIN ALLOY ELEMENTS FOR THERMORESISTANT STEEL**

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■ **Abstract:**

The paper presents the results of the research made under laboratory experimental testing, on OLT45K steel, intended to the manufacturing of tubes, used at high temperature in the make-up of thermal-energetic installation. Mechanical driving testing has been made at the temperature of 450°C, on shares of test-bars drawn out of a number of 50 charges, with a view to achieving the optimization of the chemical composition of this steel type. The optimization, under experimental dates, suggests alternatives of combinations among the main elements of the chemical composition, so as the steel can be elaborated with superior mechanical features at high temperature. The obtained results have a large feasibility area, and can be also endorsed for other steel types and mechanical features for which the optimization is viewed, therefore being very useful to technologists, in the process of achieving a certain type of steel.

4. EUGEN GHITA, LUCIA VILCEANU, RAMON BALOGH, MONICA DOBRA

**AN EXPERIMENTAL ANALYSIS ABOUT THE FRACTURE OF THE WHEELSET-AXLES OF THE 5100 KW ELECTRIC LOCOMOTIVE**

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■ **Abstract:**

The paper is focused on some experimental analysis performed in the Testing Materials Laboratory belonging to I.C.M. Resita regarding the appearance of cracks in the wheelset-axles of the 5100 kW electric locomotives. Chemical, traction, bending dynamic and torsion tests are performed for different wheelset-axles, different rolling distances and different working conditions which for the "stick-slip" phenomenon occurred.

5. REMUS BOBOESCU, ION SPOREA, ILARIE BORDEAȘU,  
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**THE USAGE OF TYPE SILIUMINIU ALLOYS WITH MAGNESIUM FOR CASTING A VERY LARGE USED PIECES**

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ATSi7Mg aluminum alloy is subjected to the processes of hardening and aging. The structural transformations are related mechanical properties of the alloy. The prezenca of the Mg<sub>2</sub>Si phase is the main cause of increasing resistance of alloys Al-Si-Mg, but with the presence of stable phase Mg<sub>2</sub>Si reduces refractivity of ternary alloys.

6. SORIN RATIU, ȘTEFAN MAKSAY, ANA JOSAN

**REGISTRATION AND PROCESSING OF FUNCTIONAL PARAMETERS VALUES FOR INTERNAL COMBUSTION ENGINES**

45

■ **Abstract:**

The article represents a study regarding the creation of a correlation between the functional parameters of the internal combustion engines, both diesel and petrol ones, with the help of the MATLAB mathematic software. The values of these parameters were registered with the help of the mega macs 55 equipment, in real time, the motor vehicles running in urban traffic.

7. ANCA IORDAN, MANUELA PĂNOIU

**DESIGN OF SEQUENCE DIAGRAMS FOR IMPLEMENTATION OF A DYNAMICAL SOFTWARE FOR DOING GEOMETRICAL CONSTRUCTIONS**

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■ **Abstract:**

This paper presents a software package, which can be used as educational software. The informatics system, including modern methods and techniques, will lead the subject

*which is using it to gain experience in understanding and managing the knowledge from geometry field and will offer the comfortable and efficient access to the newest information and knowledge. The investigation can be oriented towards reaching of some precise purposes or can be an exploration.*

8. *GELU OVIDIU TIRIAN, STELA RUSU-ANGHEL, CAMELIA PINCA-BRETOTEAN*  
**PREDICTION OF THE SIGNALS USING THE NEURONAL NETWORKS**

53

■ **Abstract:**

*This paper work refers to the prediction problems which are used with the help of the neuronal networks. The network is made of a neuron whose function is linear and who has the past few 5 input values of the useful signal  $x(t)$  – this signal must be predicted. The training algorithm is Widrow-Hoff. This algorithm decreases the number of square errors between the output of the network and the required value, and it eventually establishes the “weight” factor.*

9. *VASILE ALEXA, CONSTANTIN GRIGORE*  
**MANAGING PRODUCTION ACTIVITIES USING THE BALANCED SCORECARD STRATEGIC MANAGEMENT SYSTEM**

57

■ **Abstract:**

*The use of an adequate management method can ensure organizational success. If until now the focus was on the financial success of organizations, now more and more important are the customers, employees, collaborators. The Balanced Scorecard (BSC) is a strategic management system that manages the company’s activities depending on its vision and strategies. Within the management instrument, the Balanced Scorecard analyses the four perspectives: the customers, learning-development, internal processes and the financial field.*

*The Balanced Scorecard looks at a business strategy from all perspectives and allows the division of the strategic objectives in individual objectives and actions down to the last operational level. The BSC can contain both quantitative and qualitative objectives.*

*For the present-day organizations information is no longer the basic component. Because the organizations administer a too big volume of data and information, the manner in which the relevant information is selected and used within the organizational actions and in decision-taking is of extreme importance. The ecosystem that underlies a Balanced Scorecard is made up of visions, missions, organizational values and competences, strategies.*

*The work deals with the way in which organizations should choose the BSC solution which meets the company’s requirements best so as to fulfill its individual needs.*

10. *VERONICA ARGESANU, MIHAELA JULA, IOAN LAZA*  
**THERMO ELASTIC INSTABILITY WITHIN A CLASS IV FRICITON JOINT**

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■ **Abstract:**

*With a class IV couple of friction joint there are conditions when the disturbances of the pressures on the interface increase, decrease or remain unchanged. When the two materials of the joint are identical a relative stability is formed regarding this phenomenon, while a good heat-conducting material coupled with a heat insulator, depending on certain characteristics of sliding speed, creates instability.*

*Materials of the same type making the joint tend to a relative stability when speaking of this phenomenon, while a joint composed of a good heat conductor material and a insulator will always show characteristics of relative sliding speed, from which instability appears.*

*Equation of this paper specifies the threshold for instability. The equations serve to provide the terms depending on which the pressure disturbance in a frontal sealing interface increases. In this case load concentrations occur in small portions of the contact surfaces, resulting in damage or separation of the rings.*

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## ***FROM THE RETEZAT NATIONAL PARK TO EUROPE'S "YELLOWSTONE" – SEEDS FOR THOUGHTS ON THE ESTABLISHMENT AND EFFICIENT MANAGEMENT OF EUROPE'S LARGEST PROTECTED AREA COVERING THE SOUTHERN AND WESTERN CARPATHIANS IN ROMANIA AND SERBIA***

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■ **Abstract:**

*The Carpathian Mountains and the Danube Delta are key biodiversity and wilderness hotspots of Romania and, indeed, for Europe. Large areas of forests in the Carpathians and extended wetland areas are places where wildlife can find a refuge and where people longing for solitude and beauty can enjoy them. Where are these places and what should we do to keep them? The proposal launched in this paper comes with the intent to convince that it is not too late to maintain the Carpathians and, even if we can not maintain the entire mountain range in its present status, there are some key areas that are already protected to certain extent and can become the largest protected area of Europe.*

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■ **Keywords:**

*CARPATHIAN MOUNTAINS, BIODIVERSITY AND WILDERNESS, RETEZAT NATIONAL PARK*

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■ **THE CARPATHIANS – A KEY AREA FOR  
CONSERVATION IN THE WORLD**

*The Carpathians arch over an area of more than 200,000 km<sup>2</sup> in Central and Eastern Europe and include territory of seven countries: Czech Republic (CZ), Hungary (HU), Poland (PL), Romania (RO), Serbia (SR), Slovakia (SK) and Ukraine (UA). Altitudes vary from 300 to 2655 m above sea level. Three sub-regions are defined in the Carpathian arc: the Western Carpathians, which are partly located in SK, PL, HU and CZ; the Eastern Carpathians, which cover parts of*

*SK, PL, UA and RO; and the Southern Carpathians, which are entirely located in Romania and Serbia. The mountains are composed mainly of sequences of sandy rocks (flysch formations) with small parts of limestone or magmatic rock. Former glaciers have curved out lakes at the highest points, whilst countless valleys owe were created by the rivers. The region receives twice as much rainfall as the surrounding area, and this freshwater feeds the Danube, Vistula and Dnister and their major tributaries Prut, Aluta and Tisza, tending up in the Black and Baltic Sea. More than 80% of*

Romania's water supply (excluding the Danube) and 40% of Ukraine's water supply comes from the Carpathians.

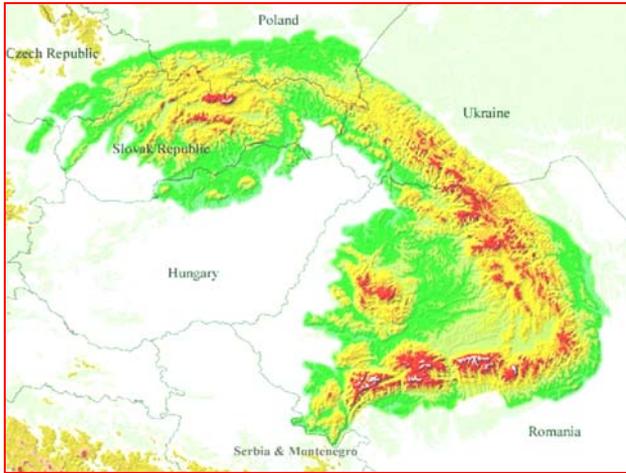


Figure 1: The Carpathian Mountains Ecoregion, source WWF DCP, 2001

Over 1/3<sup>d</sup> of this mountain range of exceptional geological, biological and landscape diversity constitutes the backbone of Romania. Compared to other mountain ranges in Europe, the Carpathians are not exceptionally high. In Romania the highest peaks are below 2.600 meters and the mountain is relatively fragmented, cut by deep valleys and with large depressions inserted between peaks and high plateaus. This fragmented landscape shaped in many parts by extensive agricultural practices and mostly close to nature forestry still harbours large areas with little human influence.

The Carpathians have many of Europe's last great wilderness areas as well as rich cultural landscapes, including the continent's most extensive tracts of montane and old-growth forest as well as most of the European populations of large carnivores.

Thanks to their exceptional level of biodiversity, the Carpathian Mountains are included in WWF's "Global 200" Ecoregion list.

The Global Ecoregions is a science-based global ranking of the Earth's most biologically outstanding terrestrial, freshwater and marine habitats. It provides a critical blueprint for biodiversity conservation at a global scale. Developed by WWF scientists in collaboration with regional experts around the world, the Global Ecoregions is the first comparative analysis of biodiversity to cover every major habitat type, spanning 5 continents and all the

world's oceans. the carpathians are considered as one of the critically endangered ecoregions.

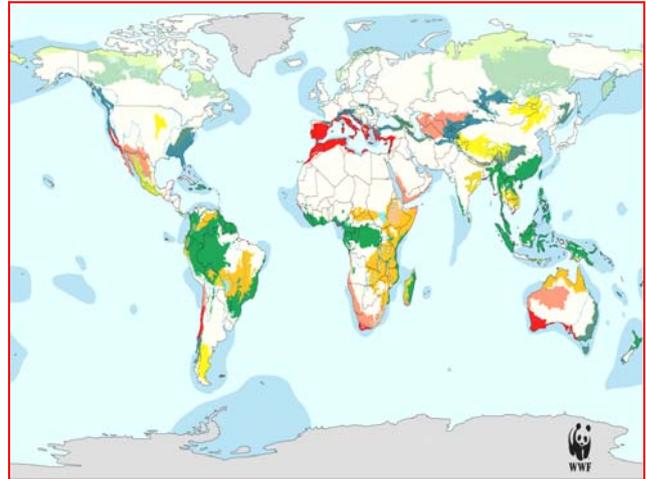


Fig. 2. Global 200, source WWF, 1999 – 2000

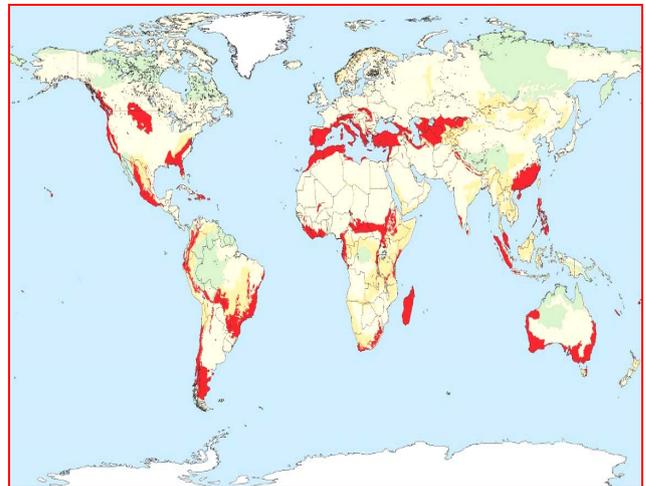


Fig. 3. Global 200 – critically endangered ecosystems indicated with the red colour, source WWF

Chosen as one of the 238 ecoregions around the world noted for 'exceptional level of biodiversity, such as high species richness or endemism, or those with unusual ecological or evolutionary phenonema, the Carpathians host Europe's most extensive tracts of montane forest, the largest remaining natural mountain beech and beech/fir forests ecosystems, and the largest area of old-growth forest left in Europe. The map below shows the old-growth forests mapped with support from the Dutch Government in the Romanian Carpathians in 2003.

The large tracks of still natural forests together with extraordinary, rich, semi-natural habitats such as mountain pastures and hay meadows, which are the result of centuries of traditional management, the region's biodiversity is

unsurpassed in Europe. One-third of all European vascular plant taxa (3,988 plant species) can be found in this region, a remarkable 481 of which are endemic. The Carpathians also contain some of the most intact, wild river systems remaining in Europe. Many of the last flooded forests – the most endangered habitat in Europe – are found in the valleys of the Carpathians. The mountains are the critical watershed areas for the Danube, Tisza and Dnister rivers.

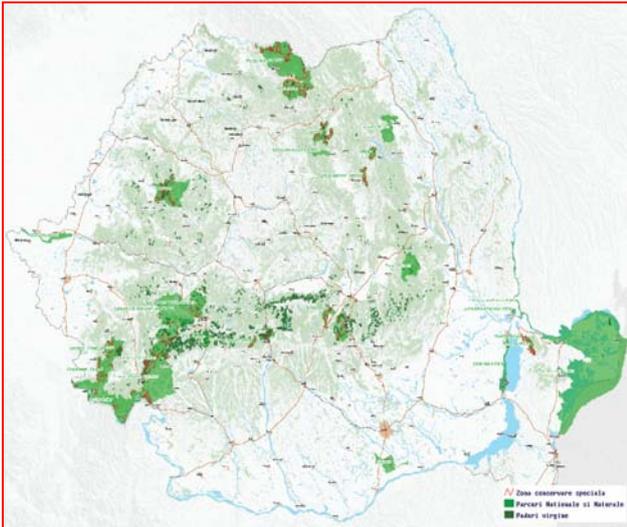


Fig. 4. Map of old-growth forests and national and nature parks in Romania, source Ministry of Environment and Forest Management Planning and Research Institute

The unique diversity of habitats of the Carpathians make them a heaven to globally threatened species such as the European bison (*Bison bonasus*), the Tatra Mountain Chamois (*Rupicapra rupicapra tatrica*) and the Imperial Eagle (*Aquila heliaca*). The bison and chamois are also endemic. The Carpathians are the last region in Europe to support viable populations of large carnivores. An estimated 8,000 brown bears (*Ursus arctos*), 4,000 wolves (*Canis lupus*) and 3,000 Lynx (*Lynx lynx*) can still be found here.

These European and global treasures are under threat as a result of the changes the region is undergoing as it becomes increasingly integrated into the European and global economy. The ecoregion is under severe threat from unsustainable logging, habitat destruction from changing land use; habitat fragmentation/destruction from infrastructure development and destruction of freshwater habitats from river regulation and flood control.

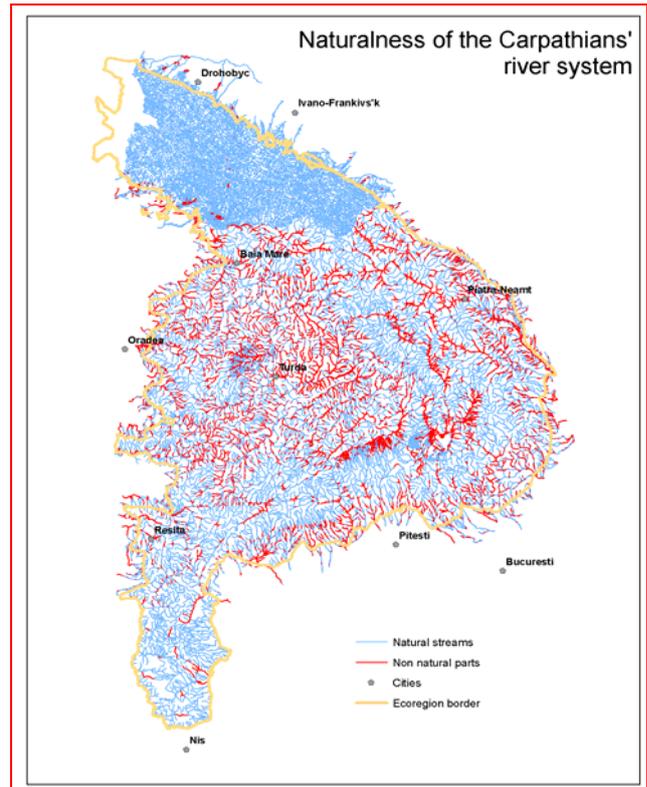


Fig.5. The river system of the Carpathians, Source Development of Carpathian Ecological Network Project, 2009

#### **HISTORICAL, POLITICAL AND ECONOMIC CONTEXT**

The Carpathians are currently undergoing unprecedented change due to economic transition and integration within the European Union. Increased exploitation of resources following recent entry into the market economy has been further exacerbated by current patterns of economic growth that have accompanied EU accession and the impacts of globalization. The situation varies considerably from country to country and from region to region, characterized by dynamic economic development in some parts and ongoing isolation in others. Five of the Carpathian countries (Czech Republic, Hungary, Poland, Slovakia and Romania) have already joined the EU and the remaining two (Serbia and Ukraine) have expressed their interest to join. To date, the EU has given Serbia but not Ukraine the perspective of future membership in the Union. To help generate high-level political support for sustainable development in the Carpathians, the Carpathian Ecoregion Initiative – initially an informal consortium of more than 50 organizations from six countries in the

*Carpathian region – created the first cross-cultural biodiversity and social-economic assessment of the Carpathians. The Danube-Carpathian Summit organised by the Romanian Government and WWF in Bucharest in April 2001 led to the development and signing of the Convention on the Protection and Sustainable Development of the Carpathians (Carpathian Convention) in Kyiv in May 2003 and came into force in January 2006. The Carpathian Convention Interim Secretariat is presently hosted by the UNEP Regional Office for Europe from Vienna, Austria. The first two Conferences of the Parties were organized in 2006 and 2008. It is expected that at the third Conference decisions will be made on the future permanent location of the Secretariat.*

*The Carpathian Convention is a framework convention and the first significant political step ensuring environmental protection and socio-economic development in the Carpathian Mountains. Efforts are now underway to give the Convention more legislative power through a series of protocols. The Convention obligates the signatories to enhance their efforts to achieve sustainable development of the Carpathian Mountains through a wide range of sector-related activities, such as biodiversity, agriculture, forestry, water management, energy and transport. The Carpathian Network of Protected Area (CNPA) has been established as part of the Carpathian Convention and is considered as one of the key contributors to the implementation of the Convention ([www.carpathianparks.org](http://www.carpathianparks.org))*

*European Union policies are a major factor, both positive and negative, on sustainable development and conservation in the Carpathian Mountains. Closer integration into the EU's Common Market and some EU policies and funding are leading to the intensification of a number of threats to the natural values and long-term sustainability of the Carpathians, including development of mass tourism facilities (e.g. ski resorts), transportation infrastructure, and agricultural intensification as well as abandonment of traditionally farmed areas.*

*At the same time, however, increasing EU integration is also driving forward adoption and implementation of a number of progressive EU laws and policies. Even Ukraine, which thus far has not been presented with the perspective of future membership in the European Union, has*

*been aligning its national laws and policies to important pieces of EU legislation. This presents potentially powerful tools for nature conservation and sustainable development, including the Water Framework Directive and the Habitats and Birds Directives. Legislation for assessing and limiting negative impacts on the environment, e.g. the Environmental Impact and Strategic Environmental Assessments (EIAs, SEAs) are also providing supportive policy environments for sustainable development.*

*At the same time, recent reforms to EU funding programmes have made significant new opportunities available for financing nature conservation and sustainable development. Within the framework of the EU's Common Agricultural Policy for the next financing period of 2007-13, the new European Agricultural Fund for Rural Development (EAFRD) provides opportunities for supporting agri-environmental measures as well as measures contributing directly to implementation of the Natura 2000 network of specially protected areas. The EU's revised regional development regulations will provide significant new opportunities within the Structural and Cohesion Funds for supporting institutional development, training and infrastructure related to conservation and sustainable development.*

*To this day, most people in the Carpathians still make their living through farming. A large majority of this farming remains small in scale, labour intensive and with low inputs relying on traditional practices. The most far-reaching threat with potential wide-ranging environmental, social and economic impacts in the Carpathians is the intensification of agriculture. To a large extent, the most fortunate result of the policy of collectivization during the communist regime was that many areas and landscapes of the Carpathians remained traditionally managed or completely undeveloped, making room for a significant level of biological diversity. These areas are now extremely vulnerable to efficient land clearing processes that accompany intensive agriculture.*

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#### ■ SOCIAL AND CULTURAL CONTEXT

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*The Carpathians are home to numerous nationalities and ethnic groups that are bound together by the highland lifestyle and many years of mixing and integration between the*

groups. Culturally, the Carpathians are steeped in age-old traditions and marked by peoples who have shared climate, hardships and a sense of isolation.

The people of the Carpathians have made their living by grazing on mountain pastures and cultivating fields in river valleys for generations. Historically, mountain shepherding has been one of the most important elements of Carpathian culture. Shepherds and their flocks can still be encountered in the Carpathian Mountains of Poland and Slovakia, and are common in the mountainous areas of Ukraine and Romania.

Much of the Carpathians escaped agricultural collectivization under Communism thanks to their relatively poor value for agriculture. As a result, private ownership remained the rule rather than the exception across much of the region. Agriculture went into a tailspin in the early 1990s following the fall of Communist regimes and the move to a more free-market system. The removal of agricultural subsidies, introduction of competition through free market reforms and resulting recession in the Carpathian countries has caused a significant decline in agricultural employment and rural incomes. The result has been the depopulation of rural areas, emigration of younger people in search of work, and consequent aging of the population remaining in rural areas. Traditional forms of land use and lifestyles are being lost, with important consequences for biodiversity, including e.g. flowering meadow ecosystems, as well as the continuity of cultural traditions and rural communities.

Restitution and privatisation of forest areas has become a major challenge for conservation in the Carpathians. Forest land which was nationalised by the Communist regimes after 1945 has been steadily handed back to its previous owners. This process has been completed in Slovakia, Czech Republic and Poland, and is currently underway in Romania, but is not planned in Ukraine where most of the former owners are dead and relevant documents are lost. Either of necessity or interest, many of the new land and forest owners have put short-term over long-term gain, and are either over-exploiting their new resources or selling them off with little regard for existing legislation governing the use and sustainability of these resources. As a result, land

and forest restitution has led to the rapid deterioration of land and forest resources that until recently has been relatively well managed or even protected. Indeed, the side effects of restituting land and forest resources pose a major threat to many protected areas in the Carpathian Ecoregion.

Alternative activities enabling sustainable livelihoods in the Carpathian Mountains for example through 'green' businesses like ecotourism, organic farming and water bottling are in progress but are still not developed enough to present a clear and attractive alternative. What is clear, however, is that the agricultural and forestry sector remains a vital part of life in the Carpathians and can provide a secure and profitable basis for the regional economy.

The key challenge for people, communities as well as biodiversity and natural resources of the region is to find a sustainable path for development, one which secures improved quality of life while holding onto the prodigious natural, cultural and social wealth of the region. In many ways, the Carpathian Ecoregion stands at a crossroads between long-term sustainable development on the one hand; and following the unsustainable path already experienced by many other parts of Europe and the world, including the gradual erosion of its biological wealth, on the other.

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#### ■ EXISTING PROTECTED AREAS – THE MOST IMPORTANT TOOL FOR MAINTAINING THE FEATURES OF THE CARPATHIANS

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Protected areas are, or should be one of the most efficient ways to maintain the exceptional biodiversity and landscape values of the Carpathian Mountains. Currently there are 285 protected areas (see map above) in the Carpathians, covering 13%<sup>1</sup> of the region, with the northwest of the Carpathians more effectively covered and managed than the southeast part.

In the new EU member states (CZ, HU, PL, SK and RO), the designation of PAs according to the EU Habitat and Bird Directives, as part of the Natura 2000 network and CBD is quite advanced, but still not sufficient. In Romania, the designation process is being continued now with the designation of future Natura 2000 sites and

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<sup>1</sup> PROTECTED AREAS LARGER THAN 1000 HA

also some new protected areas of national importance. Serbia has a small part of the Carpathians, with one national park already designated. Ukraine took over the PA system, which had been established before 1990. In general, the existing PAs have very low levels of financial and political support for protection and management activities, and the cooperation between existing trans-boundary protected areas is low.

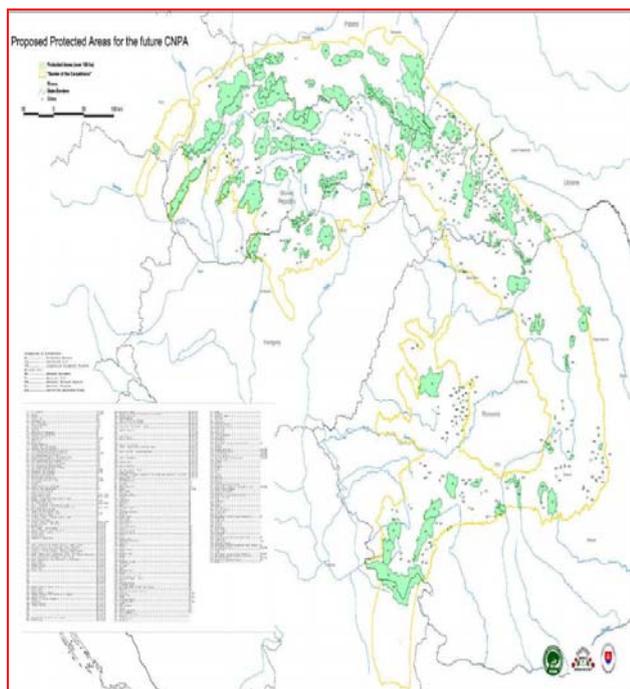


Figure 6: Protected Areas in the Carpathians, 2007

In Romania the distribution of protected areas established at the national level reflects very well that most of the natural values of the country are concentrated in the Carpathian Mountains. Most of the large areas that qualify as wilderness, natural or high biodiversity areas in the Romanian Carpathian Mountains are included in national and nature parks. The 14 national parks, equivalent of IUCN category II protected areas have core areas defined in the legislation as “integral protection zones” where the use of natural resources or any other human activities, except visitor access, are forbidden. Some of the alpine and subalpine pastures is being used by local communities for grazing to continue traditional activities that contribute also to the maintenance of some specific biodiversity. Areas ranging from a few thousand to 30 – 40 thousand hectares of forests or forest landscapes are still very well preserved in these national parks, with little or no human activities allowed.

Within these core areas large tracks of old-growth forests are still present. More than 900 smaller protected areas are also contributing to the maintenance of rare species and ecosystems.

Table 1: Protected Areas in the Carpathians – data collected by WWFD DCP, 2007

Country	No of PAs <sup>1</sup>	Total area (ha)	Legal responsibility for PA	Type of management authority
Romania	94	644,942	Ministry of Environment and Water Management	National Forest Authority, NGOs, local authorities, universities, private persons
Slovakia	64	817,720	Ministry of Environment /State Nature Conservancy	Forest authority; Forest owners and users; NGOs
Ukraine	77	355,880	Ministry of Environment and Natural Resources	State Agency for Protected Areas
Poland	21	556,496	Ministry of Environment	National Park, State Forest Administration, Local Forestry offices
Hungary	15	161,487	Ministry of Environment	National Park Directorates
Czech Republic	13	205,832	Ministry of Environment	Administration of Protected Areas
Serbia and Montenegro	1	62,943	Ministry of Science and Environmental Protection of the Republic of Serbia	Public Enterprises (mostly), NGOs approved by the Institute for Nature Conservation of Serbia
Total	285	2,785,300		

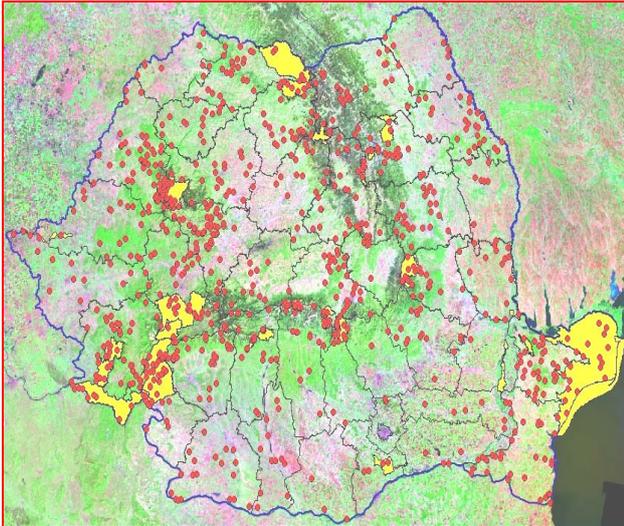


Figure 7 Map of Romanian Protected Areas at the national level, Ministry of Environment and Sustainable Development, 2007. Yellow: National and nature parks (IUCN category II and V) and biosphere reserves; Red: reserves and natural monuments (IUCN categories I, III and IV)

**FIRST STEPS TOWARDS ESTABLISHING CORRIDORS AND A LARGE SCALE PROTECTED AREA IN THE CARPATHIANS**

Even if protected areas are considered the most efficient tool for nature protection, they are not yet covering all critical areas for biodiversity and landscape conservation and, maybe more importantly, are not yet established as a real network. Sometimes protected areas are too small to allow enough room for natural processes and adaptation to new challenges, like climate change.

A recent analysis carried out to establish critical areas for an ecological corridor in the Carpathians. The study developed within the Development of a Carpathian Ecological Network Project is in an advance stage for Romania, Ukraine and Serbia and just started for Slovakia, the Czech Republic and Poland. The project covering Romania, Ukraine and Serbia is implemented by the Carpathian Ecoregion Initiative (CERI) Alterra, Bio/consult Ltd., the Daphne Institute of Applied Ecology, the European Centre for Nature Conservation (ECNC) and WWF-DCPO with financial support from the Dutch BBI-Matra programme. Critical gaps have been identified for biodiversity conservation, but also important areas that are already under some kind of protection and could easily become large refuges for wildlife. A preliminary map showing existing protected

areas (green) and critical areas for a functional ecological network are presented below. Please note that this map (Figure 8) and the one presented in Figure 5 and 10 are draft maps of the Development of Ecological Networks Project, subject to improvement in the coming weeks.

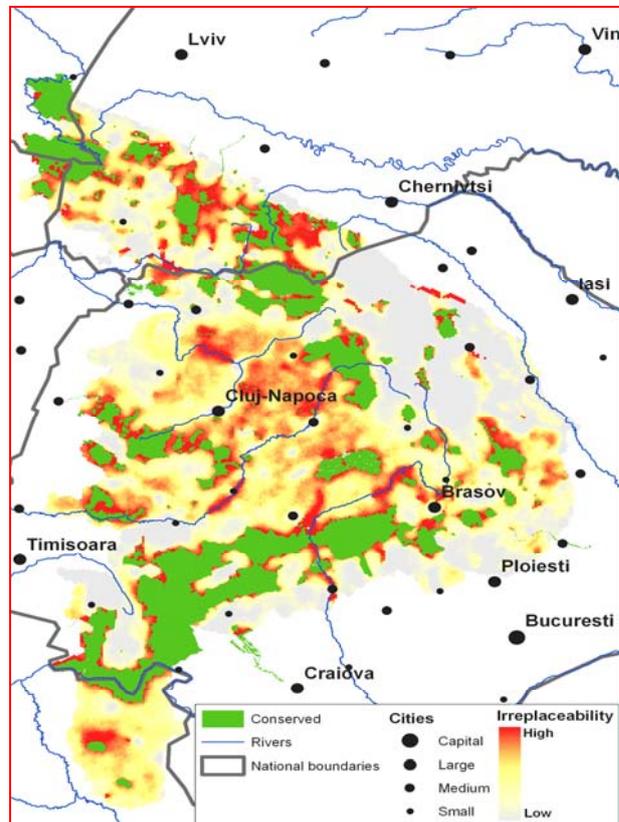


Fig. 8. Preliminary map of critical areas for biodiversity and protected area coverage in Romania, Ukraine and Serbia, source Development of a Carpathian Ecological Network Project, 2009

The map shows an amazing corridor of protected areas in the Southern Carpathians, stretching almost from the Prahova Valley to Djerdap National Park in Serbia.

If we consider only the protected areas of national interest, i.e. the national and nature parks (IUCN management categories II and V), the corridor is obvious only in the South-Western part of the Carpathians. The valuable biodiversity and landscapes have a good legal protection offered by the complex of 8 national and nature parks: Retezat, Domogled Valea Cernei and Cheile Nerei - Beusnita, Semenic - Cheile Carasului, Defileul Jiului national parks, Portile de Fier, Gradistea Muncelului - Cioclovina Nature Parks, Tara Hategului and Platoul Mehedinti Geoparks. With more than

500.000 ha this corridor is the largest area with a legal protected statute not only in Romania, but maybe for most of Europe. The Djerdap National Park in Serbia help stretch this large protected area over the border in Serbia.

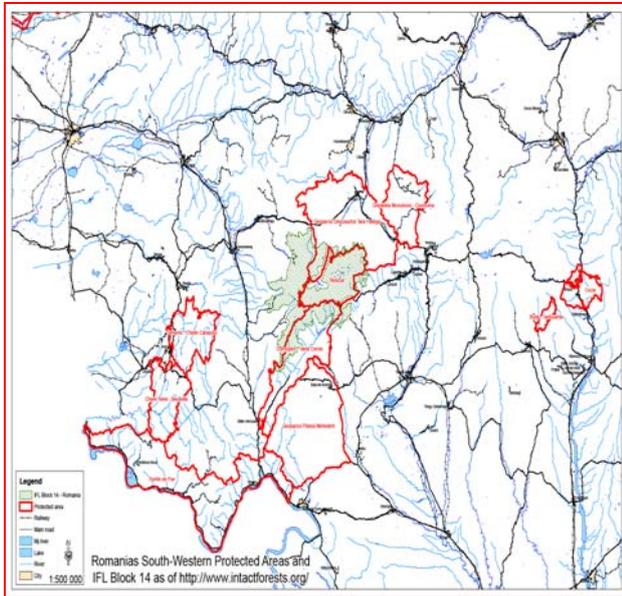


Fig.9. The protected area complex and the Intact Forest Landscape in the South Western Carpathians of Romania, source Retezat National Park, 2007

Table 2. Protected areas of national interest that could be the basis of the „European Yellowstone” in the Southern Carpathians

Protected Area	Surface [ha]
Parcul Natural Bucegi	32.598
Parcul National Piatra Craiului	14.781
Parcul National Cozia	16.721
Parcul National Buila-Vanturarita	4.491
Parcul National Defileul Jiului	11.136
Parcul Natural Gradistea Muncelului - Cioclovina	38.116
Geoparcul Dinozaurilor Tara Hategului	100.487
Parcul National Retezat	38.117
Parcul National Domogled - Valea Cernei	61.190
Geoparcul Platoul Mehedinti	106.492
Parcul Natural Portile de Fier	128.196
Parcul National Cheile Nerei - Beusnita	36.707
Parcul National Semenic - Cheile Carasului	36.219
<b>Total - Southern Carpathians</b>	<b>625.250</b>
<b>Total - South-Western Carpathians Protected area complex of the South-Western Carpathians</b>	<b>556.66</b>

This large corridor or complex of protected areas covers also a large part of the last Intact Forest Landscape (IFL) on the European continent, located south to the polar circle. A study developed under the coordination of Greenpeace, looking to large areas of forest landscape with no or very low human disturbance mapped all Intact Forest Landscapes in the World larger than 500 km<sup>2</sup>. The last “green spot” of Intact Forest Landscapes on the European map, if Scandinavian countries and Russia are excluded, is located here, in Romania, in the south-western corner of the Carpathians. Almost 90% of the IFL is already included in existing protected areas, but management measures are not yet adapted to support maintenance of this exceptional value. The IFL concept is not yet defined and accepted in the Romanian legislation and in the conservation management practices, even if the exceptional and unique value of the area has been recently confirmed through a study of the Ministry of Environment Sustainable Development. Economic developed through the Institute of Forest Management Planning and Research. Pressures are already high on this area, especially from transport and tourism infrastructure development and forestry.

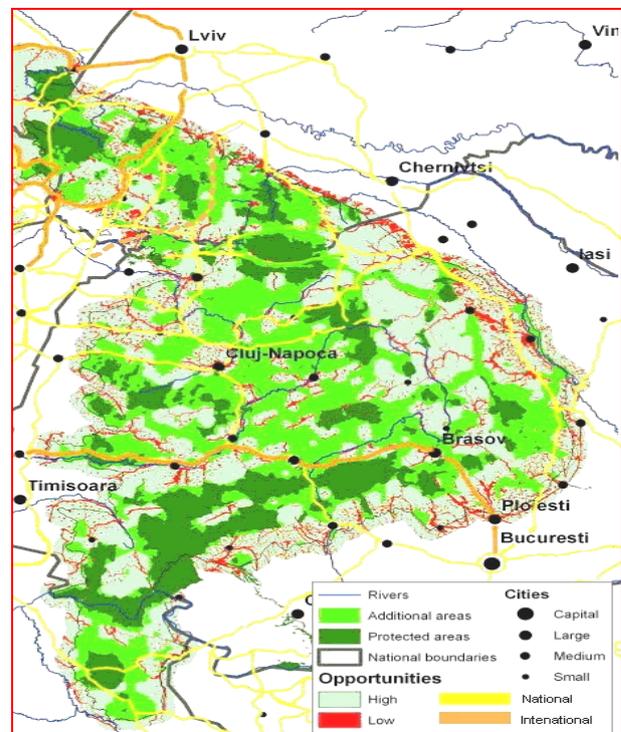


Fig.10. Existing major transport corridors and areas suitable for sustainable development, source Development of the Carpathian Ecological Network project, 2009

If we add the new protected areas, designated as future Natura 2000 sites, i.e. if we add the Fagaras Mountain SCI, the Frumoasa SPA, Strei-Hateg SCI, Parang SCI and the Tarcu SCI the extended "Yellowstone" comes into shape, covering almost one million hectares of the most valuable areas of the Carpathians.

These proposed "European Yellowstone" protected area would not only protect the representative landscapes and the rich forest and alpine biodiversity, but would also include many of the un-protected old-growth forests of Romania.

The Carpathian Ecological Network project, through a further analysis of the main transport infrastructure that is already developed in the region, demonstrates that the Southern Carpathian Protected Area Complex or the South-Western Protected Area Complex are not yet fragmented by major infrastructure development.

**■ PRESSURES AND THREATS THAT HAVE TO BE ADDRESSED TO ALLOW EFFICIENT PROTECTED AREA MANAGEMENT IN EUROPE'S LARGEST PROTECTED AREA**

Looking to the maps it is obvious that a critical first step is already done for most of the areas that would form Europe's largest protected area: 19 national and nature parks and future Natura 2000 sites are designated officially by the Romanian and Serbian government.

However, an important question is still open: how realistic is to plan for a Europe's largest protected area in the Southern Carpathians?

The brief analysis of the socio-economic context presented above, shows that the entire Carpathians are under significant development pressure that will be most likely present in the future, so the threats will not diminish, but most likely increase.

In 2001 a group of Romanian and foreign specialists trying to design an ecological network for large carnivores as a tool to secure one of Europe's most representative and healthy populations of brown bears (*Ursus arctos*), wolves (*Canis lupus*) and lynx (*Lynx lynx*), has identified the following threats to wilderness areas and large areas that include natural forests and other ecosystems needed by these keystone species:

1. Land privatisation and encroachment, as more than 40% of the Carpathian forests have been fragmented through land restitution and un-sustainable management after 1990;
2. Changes in forestry, in the close to nature management before 1990 to a management that looks more to the economic benefits, determined by the pressure of the newly developed market economy;
3. Changes in agricultural practices, mostly land abandonment
4. Hunting and poaching
5. Stream valley deterioration, with an increasing pressure from hydropower development in the mountain areas – an increasing threat now, with the new commitments of Romania as a member of the European Union to reduce the use of fossil fuels
6. Very intense development of new transport infrastructure and associated pollution along the heavily used roads

As these threats are very relevant for the area of the potential "European Yellowstone", even though the areas are already included in protected areas, a brief analysis of the major threats is presented below.

**Direct threats**

✚ **Unsustainable logging:** The Carpathian forests, particularly the old-growth forests and the forest in the lowlands such as floodplain forest are being cleared at an alarming rate. In order to get a short-term gain from the forest, exacerbated by the ongoing processes of land restitution, many forest owners or illegal loggers are reducing the quantity and quality of the forest in the Carpathians. Illegal logging has become a profitable business and is common in the Carpathians partly due to very poor forest governance systems.

✚ **Habitat destruction from changing land use:** The Carpathians are rich in a diverse set of habitats based on the limited population pressure and the less intensive natural resource management systems such as agriculture. The persistence of low intensity, traditional agricultural practices in the Carpathians makes the region the last bastion of many semi-natural grasslands that have vanished from most of Europe. With increasing intensification of agriculture and

land abandonment in many of the remote, rural villages, these nature rich systems are not being maintained and severe levels of biodiversity loss are underway.

✚ **Habitat fragmentation/destruction from infrastructure development:** Attempts to promote rapid economic development has led to poorly planned and inappropriate infrastructure development such as roads and ski developments in and through protected areas. Habitats are being torn up and fragmented by rapid growth in infrastructure development across the Carpathians. After many years of economic neglect, investment has been welcomed, but the relevant planning authorities and decision-makers lack the awareness and understanding as well as relevant skills and tools to seek sustainable solutions to infrastructure development and nature and resource conservation.

✚ **Destruction of freshwater habitats from river regulation and flood control:** The Carpathian region is remarkably rich in relatively intact river systems, brimming with life and providing drinking water to millions of people in southeast Europe. However, with the destruction of natural habitats and the growth of housing development in appropriate areas rivers have become the focus of the regulation and control work. This is ongoing and rampant throughout the region despite a growing understanding of the role of natural ecosystems in the provision of drinking water, flood control, recreation and waste water treatment.

#### **Indirect threats (root causes)**

The main root causes of threats to the Carpathians Ecoregion are as follows:

✚ **Inappropriate rural development:** The region contains one of the biggest areas of highly diverse semi-natural habitat and high-nature value farming systems in Europe, which is associated with more traditional, less intensive forms of production. These sustainable economic practices are threatened by abandonment in the highlands and intensification in the lowlands, which could mean also the lost of an irreparable cultural heritage and lifestyle.

✚ **Lack of financial and technical support:** Forest protection measures as well as protected area management measures are

often inadequate because of weak legislative frameworks and/or enforcement of existing legislation in the region. The lack of financial resources for the enforcement of existing legislation leads to illegal activities, including logging, corruption, and the inability to tackle cultural issues. In many cases, forest and protected area governance should be significantly improved.

✚ **Land restitution and privatization:** Land privatization and restitution are also resulting in activities that maximize short-term gain above all else – for example, increased cropping on unstable slopes that exacerbates erosion, or the clearing of small privately owned forests. Forest restitution also brings on the scene of forestry new actors – owners and administrators – who need to learn and implement sustainable forest management practices.

✚ **Unsustainable tourism** represents both a significant challenge to the biodiversity of the Carpathians, as well as an important opportunity for rural development for the region. Increased sustainable tourism in mountain areas is now considered as presenting significant potential for benefits to both rural environments and economies in the future. However, if not properly planned and developed, tourism will continue to represent a real threat through over-development of certain areas, and by opening up access to natural areas that should be preserved for nature.

✚ **Short-term economic gain:** The poverty suffered in the region and the opportunities of the capital and market opportunities has led to a rush for short-term economic gain through inappropriate development, emigration and rapid exploitation (legal and illegal) of the natural resources of the region. Corruption and poor governance have greatly facilitated and accelerated this process. Longer-term economic and social strategies are struggling to survive and predominate in this environment. As a result, protected areas have suffered throughout the Carpathians.

In 2006 an other group of specialists, most of them in charge with the management of national and nature parks identify the same threats. Protected area managers and some of the key stakeholders from the existing protected

areas have identified the top pressures and threats to protected areas, during a workshop organized by WWF Danube Carpathian Programme. The workshop was aiming to assess protected area management at the system level, using the Rapid Assessment and Prioritization Methodology of Protected Area Management (RAPPAM) developed by WWF. For national parks the most important pressure and threat identified is logging, followed by land use change and hunting / poaching. Land use change, logging, waste disposal and loss of traditions are the main threats identified for nature parks. Even though loss of traditions might not seem a threat that should concern nature conservationists, it is important to understand that the loss of traditions is strongly linked to traditional livelihoods more generally, involving agricultural practices that were significantly contributing to the maintenance of the biodiversity and valuable mosaic landscapes throughout the Carpathians.

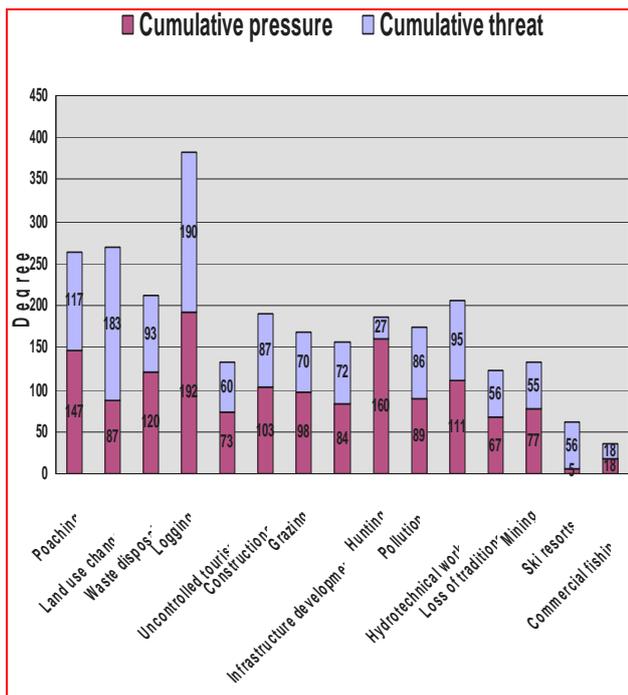


Fig. 11. The most significant threats and pressures to national parks, 2006, RAPPAM workshop

These threats are worrying by themselves. Adding the **unfavourable policy environment and weak protected area policies**, identified and acknowledged during the RAPPAM workshop by protected area managers, do not help in planning for a hopeful future for protected areas in Romania. As a new member of the European Union (EU), Romania had to

extend areas protected for their biodiversity values, increasing the surface of protected areas from about 8% of the national territory represented by national parks, nature parks, biosphere reserves, nature reserves and natural monuments to about 19% with the proposed Natura 2000 sites. But no resources other than some of the funds coming from the European Union are planned to develop an efficient protected area management system. Further more, the National Agency for Protected Areas, established after years of debates, in 2008 is now on the edge of disappearing even before it started to work for the support of protected area managers.

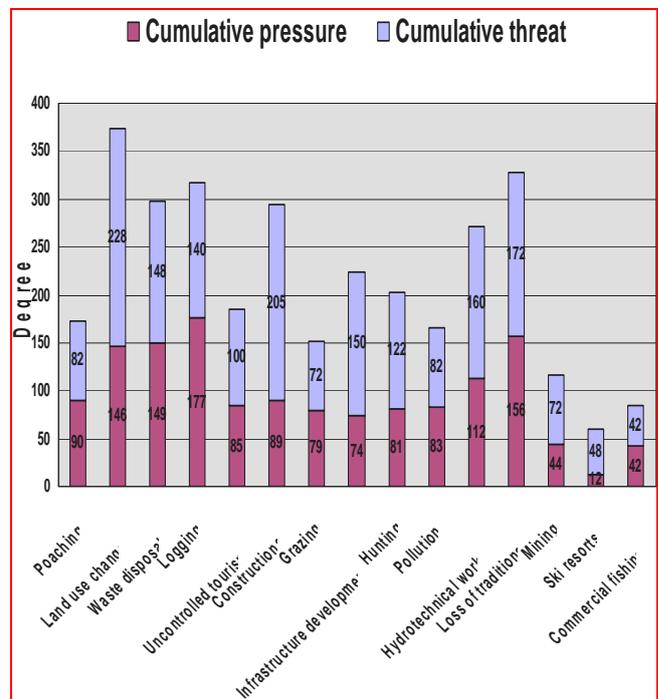


Fig. 12. The most significant threats and pressures to nature parks, 2006, RAPPAM workshop

The most important aspects for protected area management and for wilderness protection and management are, of course, related to financial and human resources. The Romanian government is not allocating at present any funds for protected area management. Further more, protected area management teams are very young and in need for training and capacity building programmes, whereas there are no coherent training programmes for protected area management. Therefore the question “how realistic is to plan for a European Yellowstone” is very legitimate.

**NEXT STEPS TO ENSURE EFFICIENT MANAGEMENT OF THE “EUROPEAN YELLOWSTONE” – THE LARGEST PROTECTED AREA**

Despite the unfavourable policy environment and serious lack of resources for maintaining the wilderness areas in Romania, there are various projects that try to find solutions by looking to values and benefits for key stakeholders or even setting up partnerships to promote and use protected areas for the benefit of people and local communities.

One of the successful initiatives is the certification of the Retezat National Park in the PAN Parks system and the establishment of a local tourism association that will promote the Retezat wilderness on the European ecotourism market. The model is there, it needs support to survive and to be extended to neighbouring areas.

There are also active conservation organizations that are supporting protected areas and the ecotourism concept as well as conservation of High Conservation Value Forests, thus contributing to the efficient management of protected areas, like WWF Danube Carpathian Programme, the Association of Ecotourism from Romania and many other NGOs from the NGO Coalition Natura2000 Romania.

But these are only small contributions to the huge task of providing a framework and enough resources for the European Yellowstone to become a viable and efficient protected area complex. Political will is key for such a big endeavour and to obtain it WWF needs the partnership and support of many other organizations and institutions. A strategy will be developed to plan the steps for such an ambitious campaign and hopefully others will join our efforts to maintain the values of Europe's largest protected area.

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## ***INTERNAL MARKETING AND PERFORMANCE IN SERVICES ORGANIZATIONS***

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### ■ **Abstract:**

*The paper tries to reveal the critical importance of service employees and human resource in delivery of quality services and creating customer satisfaction. We consider that the employees' abilities (attitudes and behavior) can improve - or reduce- the reputation of services organization (employees are responsible for the organizational performance). Internal marketing is the vision of a services organization that wants to transform its employees in loyal customers. By satisfying „internal customers”, the organization improves its ability of satisfying the „external customers” successfully.*

*Internal marketing is a concept aimed at developing customer conscious employees that will consistently deliver superior quality service to the external marketplace. For the purpose of this paper the group will focus on the customer orientation perspective as it is relevant in the context of high contact service employees.*

*In the context of customer orientation internal marketing considers the attraction, retention and motivation of service-minded employees. Internal marketing is a technique implemented by the organization in an attempt to ensure the provision of excellent service.*

*This paper focuses on the fact that the services organization's performance is fundamentally based on the way managers lead – using their creativity, imagination, competence – the employees.*

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### ■ **Keywords:**

*Internal marketing, customer satisfaction, performance, employees*

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### ■ **INTRODUCTION TO INTERNAL MARKETING**

*Internal marketing was first proposed within the services literature in the 1970's as a solution to the problem of delivering high quality service (Vary and Lewis, 1998). Internal marketing is a concept aimed at developing customer conscious employees that will consistently deliver superior quality service to the external marketplace (Papasolomou-Doukakis, 2003). Internal marketing depends on a variety of individual activities throughout the organizations and it attempts to inform and*

*educate the employee regarding the organizations mission the benefits of the product or service being sold, and the expectations of the organizations customers (Vary and Lewis, 1998). Such a programme aimed at generating employee commitment is not new as it is inherent in total quality management literature. According to Ahmed and Rafiq (2002, p.1) internal marketing requires:*

- ✚ *The acceptance of marketing techniques and philosophy within an organization*

- ✚ Customer orientation and a market orientation
- ✚ A participative approach to management
- ✚ A strategic approach to human resources management
- ✚ The coordination of all management activity to achieve customer or market orientation or customer focused management.

#### ■ DEFINITION OF INTERNAL MARKETING

Internal marketing is an ambiguous concept (Flipo, 2000). The term internal marketing is used widely as a means of highlighting commitment to improving the effectiveness of the services offered by an organizations' resources (Gilmore, 2000). Internal marketing is not a departmental function rather an organizational activity as the entire resources within the organization must be coordinated (Hogg and Carter, 2000).

The definitions reviewed within the literature highlight the ability possessed by internal marketing to improve service quality through an organizational effort. The definitions encountered within the literature can be categorized according to three perspectives, the internal customer, the development of a customer orientation and the theory of internal marketing as an implementation mechanism. For the purpose of this paper the group will focus on the customer orientation perspective as it is relevant in the context of high contact service employees.

#### ■ CUSTOMER ORIENTATION

Internal marketing has been defined as the approach employed by the organization to advocate the philosophies of customer and service orientation throughout the organization through the motivation of employees (Varey, 1994). In this context the organization attempts to install a set of values related to achieving a superior service climate within the employees belief systems (Varey, 1994).

Barnes (1998) approaches internal marketing in a similar manner by defining it as actions taken by the organization to ensure that customers receive the highest standard of service due to the employees' commitment to service quality.

The organisation cultivates employee commitment by encouraging the use of customer focused quality techniques (Ballantyne, 1991).

In the context of customer orientation internal marketing considers the attraction, retention and motivation of service-minded employees. The motivation of employees is not enough in itself, as the customer orientation, must be communicated into the external marketplace through employee action (Rafiq and Ahmed, 2000). George (1990) illustrated that relational exchanges between employees within an organization should be considered a prerequisite for successful exchanges with external markets. The satisfaction of the internal customer is of critical importance as; satisfaction will ultimately effect the satisfaction of the external market (Ballantyne, 1997). Internal marketing is a technique implemented by the organization in an attempt to ensure the provision of excellent service.

#### ■ THE MODELS OF INTERNAL MARKETING

Gronroos (\*\*\*) believes Internal marketing is concerned with ensuring employees are consistently conscious of delivering service quality. The model highlights how internal marketing should be supported by management with information exchange, recruitment and training and employee decision making (Rafiq and Ahmed, 2002). Employees realize the importance of their position within the organization and develop into satisfied individuals. The model stresses the importance of interactive marketing in conjunction with internal marketing. Interactive marketing is a proposed with how customer contact employees take care of customers during service encounters (Bitner and Evans, 1993). By improving the service encounter through internal marketing customer satisfaction and employee motivation can be increased.

However, Gronroos (\*\*\*) does not encapsulate all the elements of internal marketing (Rafiq and Ahmed 2000). The elements of internal marketing identified by Rafiq and Ahmed (2000) include:

- ✚ Employee motivation and satisfaction
- ✚ Customer orientation and customer satisfaction

- ✚ *Interventional co-ordination and integration*
- ✚ *Marketing like approach to the above*
- ✚ *Implementation of specific corporate and functional strategies*

Rafiq and Ahmed developed a comprehensive model of internal marketing based on these elements. According to the model the use of a marketing like approach is fundamental in internal marketing, as it incites the employee to become customer orientated through motivation and coordination of functional departments (Rafiq and Ahmed, 2002). Job satisfaction is incorporated due to the belief that if the internal customer is satisfied in the service position this satisfaction will be transferred to the external customer (Rafiq and Ahmed 2000). Empowerment is integrated into the model to highlight the importance of allowing the employee flexibility in terms of decision-making during the service encounter (Rafiq and Ahmed, 2000).

This model focuses on the area of service quality so it is largely applicable in the service industry.

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■ **THE OBJECTIVES OF INTERNAL MARKETING**

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Internal marketing aims to improve customer consciousness by changing the beliefs of the front line employees (Ahmed, Rafiq and Saad, 2003). Helman and Payne (1992) believe the objectives of marketing depend on the reason it is being implemented. Internal marketing may be concerned with improving employee routines through internal motivation. Internal marketing may be concerned with ensuring the entire organization understands each department's function within the organization. The internal marketing function may be aimed at marketing the organizations product or services to customers.

Internal marketing aims to improve the overall business process within an organization to ensure that resources to progress the organizations aspiration are made available to the internal customer (Joesph, 1996).

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■ **MOTIVATING SERVICE EMPLOYEES**  
 ■ **Why Motivate Employees**

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As previously discussed, the service encounter and internal marketing include the use of motivation, as a perquisite for their success in the marketing of services. Management need to

be aware of motivations exact connotation to comprehend its use to their business. Motivation can be defined as "the development of a desire within an employee to perform a task to his/her greatest ability based on that individual's own initiative" (Rudolf and Kleiner, 1989, p. 1). By analyzing the definition, one can ascertain, motivation to be the level at which an employee will perform a specified activity for the company, an imperative function for success. Motivation can also mean employees "...strive to reach peak performance every day, ... enjoy the continual challenge of improving results, genuinely care about their peers and their company, and will maintain positive results" (Evenson, 2003, p.21), or as "the willingness to exert high levels of effort toward organizational goals, conditioned by the person's ability to satisfy some individual need" (Robbins, 1993 as cited in Lu, 1999, p. 63).

The definitions of motivation, lead an organization to believe their employees will perform their specified tasks better than the norm and will genuinely wish to do so, while this is important for the business, motivation can also have other benefits. Carlsen (2003) believes a motivated workforce is essential, as the complete participation of employees will inevitably drive the profitability of the organization. Another paramount concern for management is, motivating their employees relates directly to the perceived increase in performance the employees with deliver from managements' participation in the exercising of motivation techniques, therefore, there is a direct result between the levels of motivation and management's participation. (Tyagi, 1982).

Certain academics have linked motivation as being a key determinant of job performance and how a poorly motivated force will be costly in terms of excessive staff turnover, higher expenses, negative morale and increased use of managements' time (Jobber, 1994). Therefore, management need to know what exactly motivates their staff so resources are not misallocated and dissatisfaction develops among employees (Jobber, 1994). While motivation is a key determinant of performance, management must not neglect how motivation is the also concerned with the educating of employees. Darmon (1974) believe motivation is the educating of employees to channel their efforts towards organizational activities and thus

increasing the performance of the said boundary spanning roles.

If management neglect to educate and motivate their employees, they will inevitable become dissatisfied or disenchanted with their job. Disenchantment in the workplace leads to absenteeism, turnover, sick leave, strikes, grievances and even accidents. Denton (1991) believes a motivated workforce would alleviate disenchantment felt by employees and improve these factors. Denton (1991) also believes a motivated workforce will lead to greater understanding, acceptance, commitment to implementation, understanding of objectives and decision making between management and employees.

Finally, motivation can also be used as a tool to develop further, the high performers and ensure they are satisfied with their work activities. Green (2000) envisages motivation to be proactive in the sense of: in dealing with employees who are high performers, motivation is essential, otherwise their performance will decline or they will simply leave the job. In the area of dealing with low performers, motivation is a prerequisite, otherwise these employees will drag results down, lower productivity and certainly won't leave the organization, as they will have nowhere else to go.

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■ **HOW MANAGEMENT CAN MOTIVATE THEIR EMPLOYEES?**

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*Rewards:* “Good manager helps sub-ordinates feel strong and responsible, who rewards them properly for good performance and who sees that things are organized in such a way that subordinates feel they know what they should be doing” (McClelland and Burnham, 1997, p.30). As McClelland and Burnham (1997) outline, management should reward their employees for their performance and loyalty. Rewards can take two forms; extrinsic rewards or intrinsic rewards.

*Extrinsic Rewards:* Extrinsic rewards as outlined by Rudolph and Kleiner (1989) and Sujan (1986) as those basic material requirements which management must meet for the employee. Examples include; salary, fringe benefits, promotions and so on. The extrinsic rewards are usually viewed by employees as a given and a must. Extrinsic rewards are usually thought of in terms of money.

Darmon (1974) believes money or financial incentives are motivators of employees' behavior and they can be used to influence their behavior; this can be used in a variety of circumstances, which may arise within the organization.

Dauten (1998) outlines how employees are best motivated, by having them bet on their own success. Therefore, management should tie their performance in with their bonuses; this will act as a motivator, as a challenge has been presented to them. Employees will want to achieve managements' goals as the greater their performance the greater the financial reward received.

*Intrinsic Rewards:* Rudolph and Kleiner (1989) outline intrinsic rewards as psychological incentives, for example, input, thanks, job rotation, job enlargement and so on. The importance of intrinsic rewards is how they build a climate and environment of trust and co-operation among employees. Or as Sujan (1986) outlines, employees who are motivated intrinsically “enjoy performing job-related tasks, such as influencing customers and learning about the company” (p.42).

Nelson (2003) contends, while money is a motivator, it is not as powerful as the following: Feeling of contribution to the job, having management tell us we are doing a good job, having the respect of our peers and colleagues, being involved and informed of developments and having meaningful and interesting work. While, Nelson (2003) finds these methods as good motivating tools, he outlines how the use of recognition is the ultimate motivator.

The importance being, “recognition is not just for the person who performed well – it also sends a message to other employees as it communicates the standard of the company” (Nelson, 2003, p.8). Nelson (2003) implores to management, recognition will improve the level of performance by employees, which inevitably improves the financial performance of the organization. Nelson (2003) believes the uses of monetary rewards are becoming “viewed as a right as opposed to reward and therefore the ability for money to serve as incentive is diminished” (p.8). Money also distracts team members as their concentration is now focused on individual cash gains. Therefore, Nelson (2003) has developed a number of ways in which

an organization can motivate their employees without incurring great financial costs.

Ways in which an organization can install recognition as low-cost (Nelson, 2003, p.9):

- + Call employees into office and say “thanks”
- + Acknowledge individual achievements
- + Create employee “hall of fame”
- + Photo collage of successful project and those who worked on it
- + Place to display memos/posters as recognition of employees work in their help in achieving goals
- + Behind – the – scenes awards for those out of limelight
- + Certificate program

Most importantly, be timely, sincere and specific.

### CONCLUSION

Many organizations testify that their employees are their most valuable resource. This is especially relevant in the service organization. Customers often base their perceptions of the service on the quality of the interaction with service personnel. For this reason it is essential that the employee is motivated to consistently deliver a high quality service experience to the customer. Motivation is especially important when employees operate in a boundary spanning position, as this involves high levels of stress and burn out.

We propose internal marketing as a mechanism for ensuring the motivation of service employees. The implementation of an internal marketing program ensures that motivation is at the forefront of managements’ priorities. This realization implores management to consider that motivation is not solely the responsibility of human resources but must be adopted by all managers throughout the organization regardless of their functional department. In summary, the importance of motivated high contact employees is fully realized through the adoption of internal marketing.

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## ***STUDY ON THE VARIATION OF CONVENTIONAL FLOW LIMIT DEPENDING ON THE MAIN ALLOY ELEMENTS FOR THERMORESISTANT STEEL***

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■ **Abstract:**

*The paper presents the results of the research made under laboratory experimental testing, on OLT45K steel, intended to the manufacturing of tubes, used at high temperature in the make-up of thermal-energetic installation. Mechanical driving testing has been made at the temperature of 450°C, on shares of test-bars drawn out of a number of 50 charges, with a view to achieving the optimization of the chemical composition of this steel type. The optimization, under experimental dates, suggests alternatives of combinations among the main elements of the chemical composition, so as the steel can be elaborated with superior mechanical features at high temperature. The obtained results have a large feasibility area, and can be also endorsed for other steel types and mechanical features for which the optimization is viewed, therefore being very useful to technologists, in the process of achieving a certain type of steel.*

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■ **Keywords:**

*high temperature, thermal resistant steel, mechanical testing, life-length, mechanical feature*

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■ **GENERAL APPRECIATION**

*Generally, any research elaboration implies some stages: gathering the dates, their modeling and the decisional working out. The informational pattern-making follows 3 steps: manual, mechanical and automatic.*

*Its results have to be presented in a shape which makes them utilizable by the beneficiary, no matter the pattern-making method.*

*A new and important problem, raised in the study of multidimensional reparations, concerns the bound among the analyzed variables and through them, among the phenomena they represent, known as correlation. It includes two fundamental problems: the first consists in describing the medium variation law of a variable depending on another (or other)*

*variable(s), known as the problem of regression and settled under the regression function, and the irrespective of the linked variable measures.*

*Estimating and sizing the thermal-electric power station pipes is extremely detailed and expensive, regarding the use of the finite element programmes, as it is very hard to specify all the testing which the pipe system is to be requested, during the estimated life length. Extreme situations and possible exploitation accidents are also hard to estimate.*

*This is the reason of choosing as a subject of the paper the making of multiple correlations, II figure, which offers information on the influence of two of the chemical composition elements on the technical running limit at the temperature guaranteed by the metal manufacturer. From the graphical representation and knowledge of the*

outline values, we can establish the desired value of the mechanical feature, for any content of an element found in the chemical composition. We can also establish the best variation fields of these elements, varying with the desired values of the studies parameter.

**EXPERIMENTAL DATES**

The numerical studies had as starting point the driving experimental testing at heat, made on shares of test-bars drawn out of a number of 50 charges of OLT 45K steel, endorsed into an electrical oven equipped with a spring, whose chemical composition is presented in [1] paper.

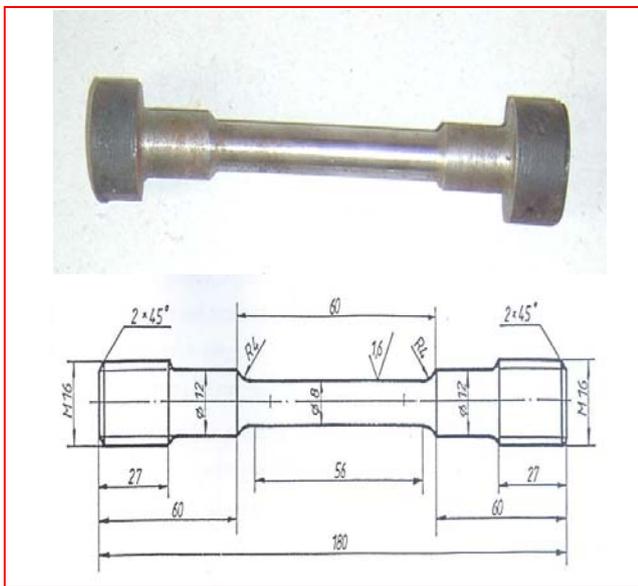


Fig.1 The shape and size of test-bars used in testing

Three test-bars have been tried for each charge, their shape and size being shown in fig.1.

**ESTABLISHING THE NUMERICAL STUDIES**

By using the experimental dates obtained after laboratory testing, it went forward to establishing some graph correlations, using MATLAB 5.0 programme. Files with experimental dates and those obtained by the rolling of the used programmes, can be found in [1] paper. The numerical results, obtained by rolling the programme are sizable, for which they are not presented in the paper. Then, the graphs obtained by mathematical pattern-making of the results.

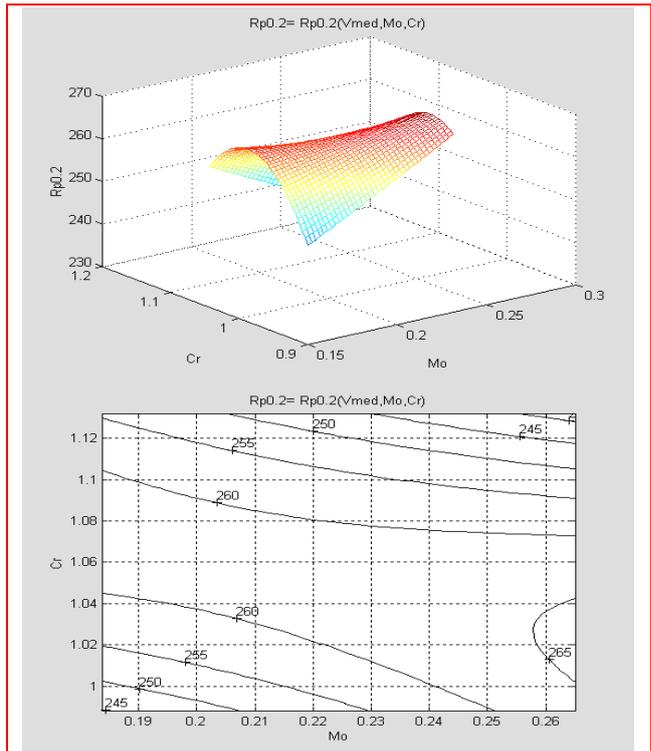


Fig.2 The variation of the technical running limit  $R_{p0.2/450}$  containing manganese and silicium, taking into consideration the medium percentage of carbon

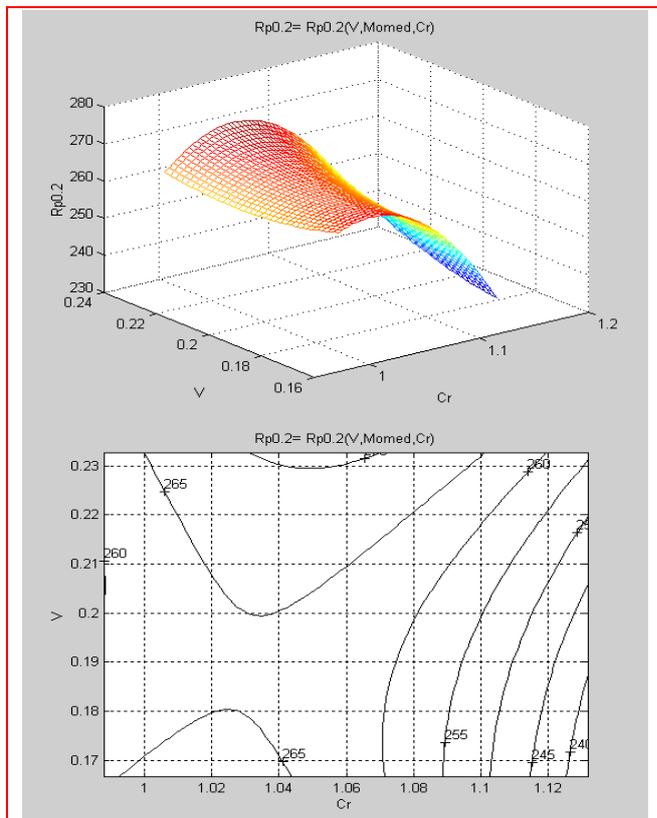


Fig.3 The variation of the technical running limit  $R_{p0.2/450}$  containing carbon and silicium, taking into consideration the medium percentage of manganese

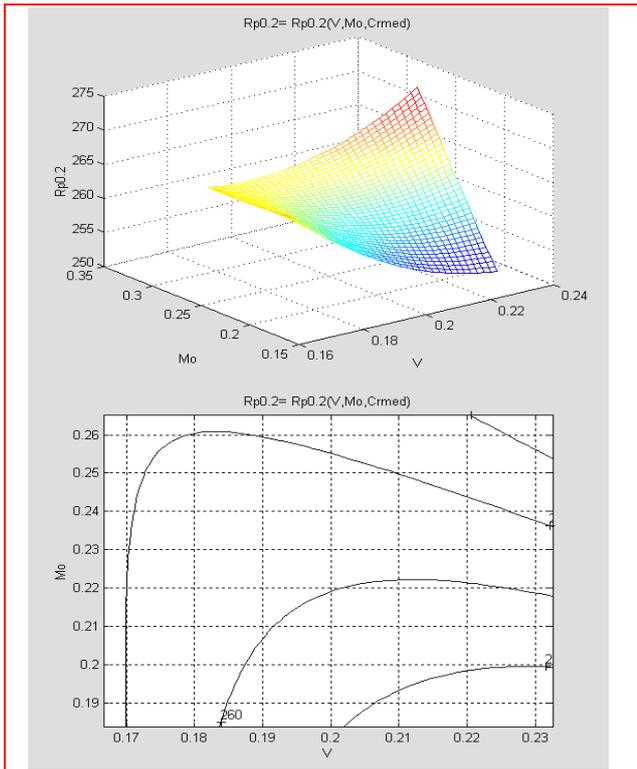


Fig.4 The variation of the technical running limit  $R_{p0.2/450}$  containing manganese and carbon, taking into consideration the medium percentage of silicon

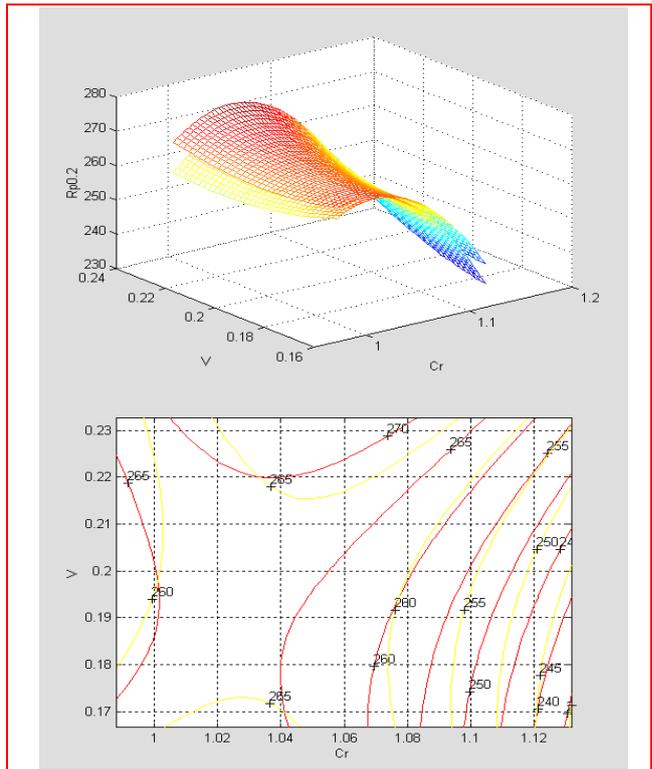


Fig.6 The delimitation of the best field for the technical running limit  $R_{p0.2/450}$ , depending on the carbon and silicon content, taking into consideration the medium percentage of manganese

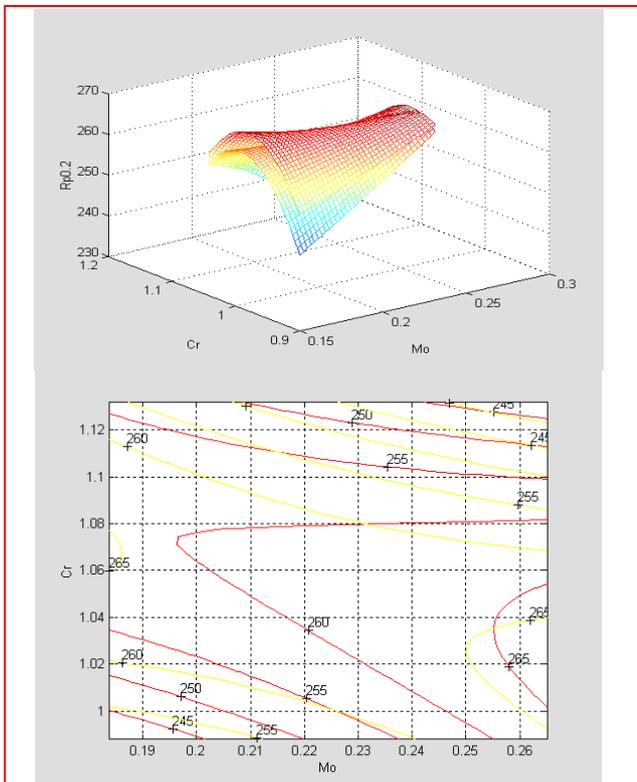


Fig.5 The delimitation of the best field for the technical running limit  $R_{p0.2/450}$  depending on the manganese and silicon content, taking into consideration the medium percentage of carbon

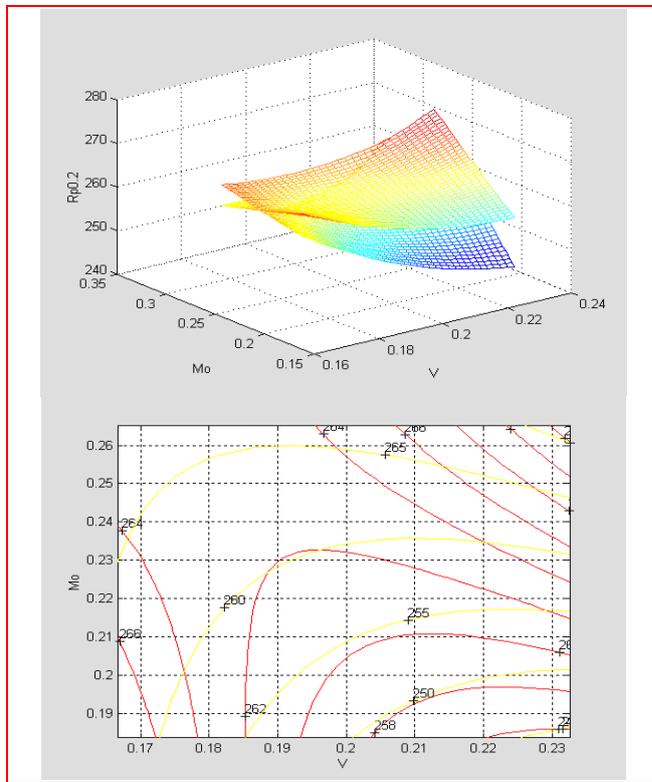


Fig.7 The delimitation of the best field for the technical running limit  $R_{p0.2/450}$ , depending on the carbon and manganese content, taking into consideration the medium percentage of silicon

Because of the huge size of dates found in such a processing of experimental dates, we stopped, focusing on the mechanical feature  $R_{p0,2/450}$ , which must be guaranteed by the metal manufacturer, for the analysed steel.

The most important feature of this steel category at high temperature is the conventional running limit at heat. This is the reason why the study has been made for establishing combinations of the best chemical composition and through the working process, for the steel to have superior mechanical features. Therefore, the obtained results follow the way of the conventional running limit for combinations of three main elements of the chemical composition. Through the multidimensional numerical pattern-making of the experimental dates, it was tried the finding of a modeling of the dependent variable, considering the independent variables  $x, y, z$  as:

$$u = C_1 \cdot x^2 + C_2 \cdot y^2 + C_3 \cdot z^2 + C_4 \cdot x \cdot y + C_5 \cdot y \cdot z + C_6 \cdot z \cdot x + C_7 \cdot x + C_8 \cdot y + C_9 \cdot z + C_{10} \quad [1]$$

The variation limits of the variable are:

$$\begin{aligned} [\%C] &= 0,16...0,23; [\%Mn] = 0,51...0,83; \\ [\%Si] &= 0,16...0,35; R_{p0,2/450} = 169...255. \end{aligned}$$

The medium values and the medium square deviation of the variables are:

$$\begin{aligned} [\%C]: 0,18563...0,01886; [\%Mn]: 0,66375...0,09545; \\ [\%Si]: 0,235...0,047697; [R_{p0,2/450}]: 08,95...17,193 \end{aligned}$$

The correlation coefficient is valued:

$$rf = 0,65599451703118,$$

and the deviation from the regression area is:

$$sf = 12,97668845383391$$

The maximum established on the 50 charges sample is given by:

$$\begin{aligned} R_{p0,2} &= 19828,0654 \cdot [\%C]^2 - 268,3624 \cdot [\%Mn]^2 \\ &+ 571,8135 \cdot [\%Si]^2 - 2984,07 \cdot [\%C] \cdot [\%Mn] \\ &+ 148,8591 \cdot [\%Mn] \cdot [\%Si] + 1182,9936 \cdot [\%Si] \cdot [\%C] \quad [2] \\ &- 5668,4577 \cdot [\%C] + 962,9562 \cdot [\%Mn] \\ &- 672,8277 \cdot [\%Si] + 472,3753 \end{aligned}$$

These 4 dimensional surfaces allow a saddle point of coordinates:

$$\begin{aligned} [\%C] &= 0,19417; [\%Mn] = 0,79343; [\%Si] = 0,2842; \\ R_{p0,2/450} &= 208,473. \end{aligned}$$

The existence of the saddle point is very important as it assures a stability of the feature close to this point, being it preferable or avoidable. In this case, it is preferable. The behavior of these hyper surfaces close to the saddle point can only be studied as tabular, which means ascribing values on concentric spheres of the studied point to the independent variable. Because of the fact that this surface cannot be represented in 4 dimensional spaces, it has been chosen the successive replacement of each independent variable, with its medium value, and obtaining the following equations:

$$\begin{aligned} R_{p0,2}C_{med} &= -268,3624 \cdot [\%Mn]^2 + 571,8135 \cdot [\%Si]^2 \\ &+ 148,8591 \cdot [\%Mn] \cdot [\%Si] + 409,0382 \cdot [\%Mn] \quad [3] \\ &+ 453,2345 \cdot [\%Si] + 103,3764 \end{aligned}$$

$$\begin{aligned} R_{p0,2}Mn_{med} &= 571,8135 \cdot [\%Si]^2 + 19828,0654 \cdot [\%C]^2 \\ &+ 1182,9936 \cdot [\%Si] \cdot [\%C] - 74,0225 \cdot [\%Si] \quad [4] \\ &- 7649,1341 \cdot [\%C] + 993,3067 \end{aligned}$$

$$\begin{aligned} R_{p0,2}Si_{med} &= 19828,0654 \cdot [\%C]^2 - 268,3624 \cdot [\%Mn]^2 \\ &- 2984,07 \cdot [\%C] \cdot [\%Mn] - 5390,4542 \cdot [\%C] \quad [5] \\ &+ 997,938 \cdot [\%Mn] + 345,8392 \end{aligned}$$

These surfaces which belong to the 3 dimensional spaces can be represented and therefore interpreted by technologists. The surfaces are shown in fig.2, fig.3, fig.4, fig.5, fig.6 and fig.7. For a more exact analysis, the corresponding level curves have been shown next to these. The knowledge of the level curves allow the establishing of the two independent variable values, so as  $R_{p0,2/450}$  can be obtained, within the limits required or imposed by the beneficiary.

By looking at the graphs shown in fig.2, and considering %C an average, you can estimate that maximum values of  $R_{p0,2/450}$  feature can be obtained for 0,50% Mn and 0,14% Si, values which are close to the inferior limit of the composition imposed by standard. From fig.3, considering % Mn an average, you can say that maximum values of  $R_{p0,2/450}$  (230 N/mm<sup>2</sup>) features can be obtained for C concentrations within the 0,12 – 0,14% limits and Si within the 0,15 – 0,18% limits, subfields which are close to the inferior limit of the composition imposed by standard. From the graphs shown in fig.4, and considering % Si an average, you can estimate that while the C and Mn grow, the  $R_{p0,2/450}$  conventional running limit grows as well. The diagrams in fig.5, fig.6

and fig.7 show the limits of the maximum field, where the metallurgic engineer can choose the element percent of the chemical composition, in order to obtain steel having the desired features of the manufacturer. Knowledge of the level curves for these maximum fields allows the correlation of the two independent variable (the contents of the chemical element) so that  $R_{p0.2/T}$  can be obtained within the limits asked by the beneficiary.

#### ■ CONCLUSION

These results allow the establishing of the best C, Mn, Si contents from the chemical composition of 12VMoCr10, so that, by the end of the elaboration, steel can possess certain imposed mechanical features.

The analysis has been done for 3 elements of the chemical composition, being able to enlarge it for both other elements, depending on the desired chemical composition and other types of steel.

Taking into consideration that the way in which one charge is done has a deep importance on the mechanical features of the steel, knowledge of these correlations is really significant for the engineer, because he is the one to estimate the values of the imposed parameter, depending on the chemical composition which allows him the adjustment of the chemical composition during the elaboration, in order to obtain the features desired by the beneficiary.

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## ***AN EXPERIMENTAL ANALYSIS ABOUT THE FRACTURE OF THE WHEELSET-AXLES OF THE 5100 KW ELECTRIC LOCOMOTIVE***

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### **■ Abstract:**

*The paper is focused on some experimental analysis performed in the Testing Materials Laboratory belonging to I.C.M. Resita regarding the appearance of cracks in the wheelset-axles of the 5100 kW electric locomotives. Chemical, traction, bending dynamic and torsion tests are performed for different wheelset-axles, different rolling distances and different working conditions which for the "stick-slip" phenomenon occurred.*

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### **■ Keywords:**

*locomotive, wheelset-axles, mechanical test, crack, stick-slip*

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### **■ INTRODUCTION**

*The proper against skating device of the C.F.R. 5100 kW electric locomotives is not very efficient when a high level difference has to be raised. As an example, when a heavy train is trailed on an important level difference (as it is the Brasov – Predeal railway route), some important oscillations of the wheelset-axles appeared. The main reason is that for difficult traction conditions, the adherence limit is exceeded. The driving torque on the wheels is divided into non-equal parts, so the "stick-slip" phenomenon of the wheelset-axles is present, which mean an alternate torsion and slip state. Because of the elastic assembling of the wheels on the axles, the whole ensemble will oscillate with a proper frequency.*

*When the phenomenon takes place in the framework of the micro-sliding domain [1],[2]*

*which means in the framework of a perfect adherence, the oscillation are of a high amplitude. The possible consequences is the appearance of a high state of stress in the wheelset-axles. But the final and the most dangerous consequence is represented by the fracture of the wheelset-axles ensemble [3]. This is the reason why the analysis of the wheel set-axles became obviously necessary [4]. It means both a mechanical,chemical analysis and an experimental non-destructive analysis, in order to detect possible crack initiating locations in the volume of the wheelset-axles.*

---

### **■ LABORATORY EXPERIMENTAL ANALYSIS**

*During the time and according to railway administration regulations, the experimental analysis often avoids the appearance of the*

wheelset-axles fractures. The main studied wheelset-axles types are presented in table 1.

Table 1.

Nr.	Locomotive type	Number of wheelset on the locomotive	Rolling distance [km]
1	060-EA-006	2	306.000
2	060-EA-040	2	481.000
3	060-EA-012	2	476.000
4	060-EA-024	6	391.000

Especially for the wheelset-axles number 3 and 4, some detailed chemical, mechanical and metallographic researches were performed, but the conclusion were drawn for all four investigated cases.

**Chemical analysis**

The chemical analysis of the wheelset-axle materials conduce to the partition of the chemical elements presented in table 2.

Table 2.

Wheelset nr.	C[%]	Mn[%]	Si[%]	Cr[%]	Ni[%]
3	0,32	0,47	0,24	1,49	1,59
4	0,33	0,52	0,27	1,49	1,62
Wheelset nr.	Mo[%]	P[%]	S[%]	Cu[%]	
3	0,40	0,011	0,010	0,08	
4	0,26	0,011	0,010	0,08	

When compare the above mentioned concentrations with the imposed chemical element concentration of the wheelset-axles belonging to 7350 HP electric locomotive, it is observed that the values are placed into the accepted range by the wheelset-axles producers. The content of 0.40% Mo on the wheelset-axles number 3, in comparison with 0.30% Mo prescribed content, will not present a non-favourable factor.

**Traction test**

The standardized traction specimen are in accordance with now-days regulations (it presents a 16 mm diameter on the calibrate circular parts). Tests were performed on an universal (traction-compression) testing machine.

The results are presented in the framework of table 3.

Table 3.

Wheel set-axles number	Number of specimen	Yield point [MPa]	Ultimate strength [MPa]	Proportional necking [%]
1	1	730	900	17,50
2	1	700	880	18,75

**DYNAMIC BENDING TEST**

The dynamic bending test specimens were manufactured both longitudinally and cross-section directionally. It means that a double number of specimens were tested, and results are presented in table 4.

Table 4.

Wheelset-axles number	Number of the specimen	Longitudinal toughness [MPa m]	Transversal toughness [MPa m]
3	1	775	425
3	2	750	337,5
3	3	800	462,5
3	4	675	462,5
3	Average	750	422
4	1	1000	500
4	2	775	450
4	3	1050	512,5
4	4	875	525
4	Average	925	497

**Torsion test**

The torsion loading represents the main loading which produces the stick-slip phenomenon. The obtained results, presented in table 5, are in accordance with the official prescriptions and regulations of the Railway Romanian Authority (A.F.E.R.)

Table 5.

Torsion torque [Nm]	Diameter of the specimen [mm]	Yield point [MPa]	Shearing ultimate strength [MPa]
940	20	598,7	783,4
980	20	624,2	770,7
960	20	611,4	777
920	20	586	764,3
920	20	586	764,3
910	20	579,6	757,9

CONCLUSION

The aspect of the cross-section fracture zone represents the main juridical factor when a wheelset-axles accident takes place. The shiny zone parts (figure 1) represent the fatigue area inside where the cracks grow in time.

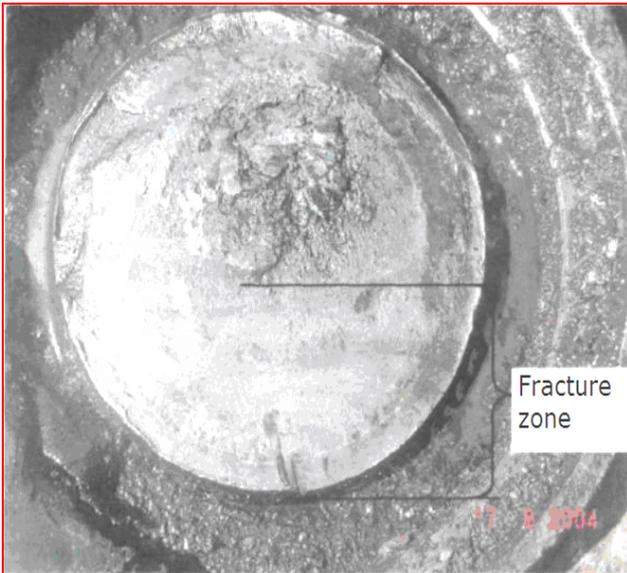


Figure 1. The aspect of the fracture zone in the body of the wheelset

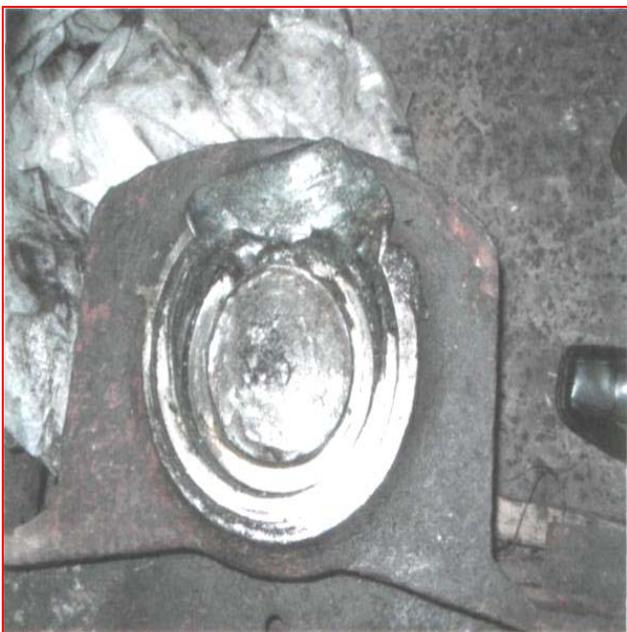


Figure 2. The aspect of the fracture zone in the extremity of the wheelset (lubrication boxes)

For the wheelset-axles nr.1, the aspect of the crack propagation is represented as two

single independent cracks growing on the free wheel.

- For the wheelset-axles nr.2, the crack is developed in a continuous circular direction.
- For the wheelset-axles nr.3, the orientation of the crack is similar, but through the cross-section of the free wheel.
- For the wheelset-axles nr.4, the crack is located under the gear wheel. These are the most dangerous types of cracks. It may be detected only by an ultrasound control. The ultrasonic crack detection is usually performed by using an a lightweight, compact and handy-portable flaw detector designed for use on large workpieces and in high-resolution measurements. The complementary equipment consist in a mobile push-cart on the rail and three touching heads (a normal one and two bending touching heads). The equipment (figure 3) is able to detect fatigue cracks in the rail head, horizontal cracks in the rail head and in the transient area between the rail head and the rail core as well cracks which are initiated from the holes.

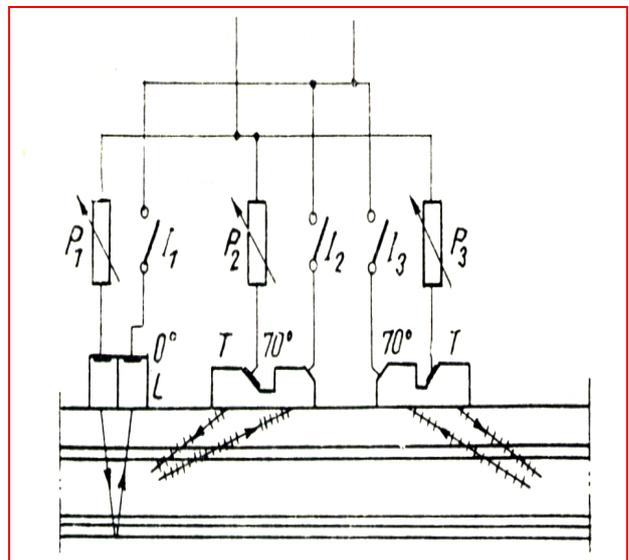


Figure 3. The mobile ultrasonic detection push-cart with three touching heads

The rail profile generates disturbed responses which have to be separated from the faults responses. Anyway, the experimental procedure is able to conduce to: the detection of the location of the cracks, the crack critical length and orientation. It may be calculated: the stress intensity coefficient at the top of the crack, the propagation rate, the estimated life-time of the

wheelset for different locations and lengths of the detected cracks.

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## **THE USAGE OF TYPE SILUMINIU ALLOYS WITH MAGNESIUM FOR CASTING A VERY LARGE USED PIECES**

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### ■ **Abstract:**

*ATSi<sub>7</sub>Mg aluminum alloy is subjected to the processes of hardening and aging. The structural transformations are related mechanical properties of the alloy. The prezenze of the Mg<sub>2</sub>Si phase is the main cause of increasing resistance of alloys Al-Si-Mg, but with the presence of stable phase Mg<sub>2</sub>Si reduces refractivity of ternary alloys.*

### ■ **Keywords:**

*aluminum alloy, mechanical properties, magnesium*

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### ■ **INTRODUCTION**

*Among the advantages of alloys siluminium ATSi<sub>12</sub>, ATSi<sub>10</sub>MnMg; ATSi<sub>7</sub>Mg; ATSi<sub>7</sub>MgTi is the used in humid atmosphere like maine atmosphere As the concentration of Si growth there is a decrease of the linear thermal expansion coefficient, but to obtain a raft structure raft in the cast [1] [2] [4] [5] [6] (the material is fragile and difficult to process).*

*For finishing the structure, increase the mechanical resistance and improve mechanical machining by cutting of type AAT siluminium (hipo and eutectic) is added to Na and Cl and salts containing F and Na, S, P, etc.. in the alloy. The hypereutectic alloys have much Si<sub>1</sub> in the structure and is difficult to be modified with salts containing Na. A greater effect in modifying these alloys siluminiu hypereutectic is obtained with substances containing S or P [6] [7] [8] [9].*

### ■ **SYSTEM ALLOYS IN Al-Si + EA (ALLOYING ELEMENTS)**

*System Al-Si alloys + Ea is one of most used in the casting aluminum alloy of great importance pieces because it possess superior mechanical and technological proprieties than other cast aluminum alloys (AAT).*

*The most typical alloy system Al-Si-Mg is widely used in casting of ATSi<sub>7</sub>Mg (6-8% Si, 0.25-0.4% Mg, the rest). This alloy is used both in the hardening state (T4) and after partial aging (T5). Is is used for castings pieces with thin walls and complex shapes used in the condition of medium loaded forces (body pump, etc.). The advantages of alloy ATSi<sub>7</sub>Mg are: good casting properties (high fluidity, minimum linear contractions) like as ATSi<sub>12</sub>; the tendency of formation of small cracks hot high temperature; good mechanical strength and satisfactory plasticity; compared with ATSi<sub>10</sub>MnMg not require autoclaves to pressure*

crystallization; is the possibility to used modifier containing Na as S, P, etc.[2]; Like disadvantages  $ATSi_7Mg$  shows: reduced machining by cutting; with increasing concentration of Mg decreases plasticity (mechanical  $R_m$  increases and the capability of machining); resistance to corrosion from  $HNO_3$ ; reduced refractivity, which may increase with increasing concentration of Si, Mg or Cu.

The hardening basic phase of ternary alloys is  $Mg_2Si$  noted as  $\beta'$ , the type chemical intermetallic component (determined by normal valence). Possess crystalline elementary cube network and does not form solid solutions  $\alpha$  with its constituents, what is characteristic ionic combinations in contrast with benthonic phases type (ex:  $Mg_2Al_3$ ).

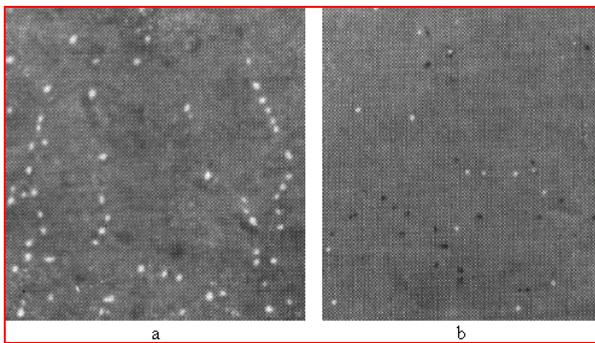


Fig. 1 Structure of alloy  $ATSi_7Mg$  (10000:1) aged a-135°C/15 h and b- a-135°C/15 h

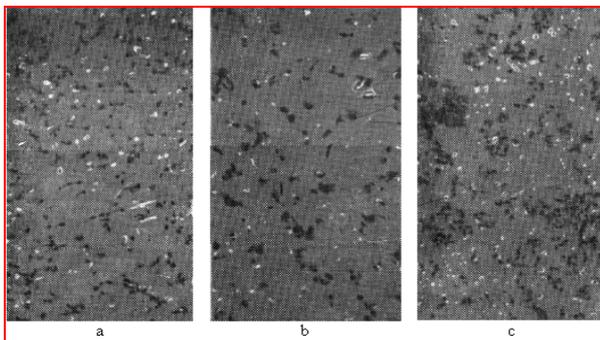


Fig.2 Structure of alloy  $ATSi_7Mg$ (10000:1) aged a-165°C in times:a15h b-25h, c-100h

Regarding the influence of Si and Mg on the effect of loss of mechanical resistance of alloys  $Al + Mg + Si$  at high temperatures [5], [6], [2], [8] ,it shows that the decomposition of  $\alpha$  solid solution of Mg and Si in Al follow the next schedule:

1. Appear in the crystal network of solid solution the Guillet-P zone. There is a change to approaches atoms of Si and Mg and formation of metastabile  $\beta'$  phase; ( $Mg_2Si$ ) - the process is very intense at high

temperatures and slow at ambient temperature. Reset of atoms position had place with the distortion is strong crystalline network and consequently there is as result strong growth mechanical resistance of siluminium type alloys at ambient temperature and reducing refractivity of temperature used in aging process (160-170oC and higher).

2. There are a formations of small grains mono- and two-dimensional phase metastabile  $\beta'$  ( $Mg_2Si$ ) which possess crystalline hexagonal network. It is believed that the training phase  $Mg_2Si$  is the main cause of increasing resistance of alloys  $Al-Si-Mg$ , but with the apparition of stable phase  $Mg_2Si$  the refractivity ternary alloys will be reduce .This clear happened at heated at 170-180°C retention time of 25h to return treatment.
3. Stable phase  $Mg_2Si$  is formed in alloys type siluminium in process to maintain at 185-220°C for several hours and at 300°C for 30 minutes to aging, with strong reduce resistance of alloy.

The alloy aging process at 180-225°C with reduced times of process can provide for  $ATSi_7Mg$  alloy high strength and low plasticity. Refractivity of these alloys can be strong increased by two ways:

- It strengthens the solid solution  $\alpha$  by a complex process of alloying which assure the separation of the granular stable phases crystallized in form of branches
- make an bonding of Si free (elementary) in the stabile component ( $Al_8Si_6Mg_3Fe$ ,  $Al_4Si_2Fe$ ,  $Al_5SiFe$  etc.) An example of these components is phase  $Mg_2Si$  which is found in most siluminium alloys ( $ATSi_{12}$ ,  $ATSi_7Mg$ , etc.)

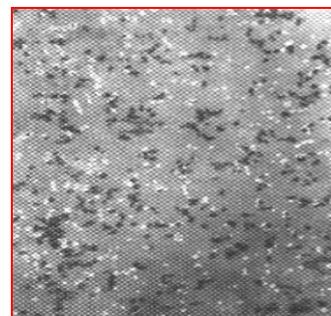


Fig. 3 Structure of alloy  $ATSi_7Mg$  (10000:1) aged a-175°C/10 h

$Mg_2Si$  phase is formed through a series of transformations that strongly distorts the crystalline network of alloy and increases the

mechanical resistance at ambient temperature (due to hardening and aging processes).

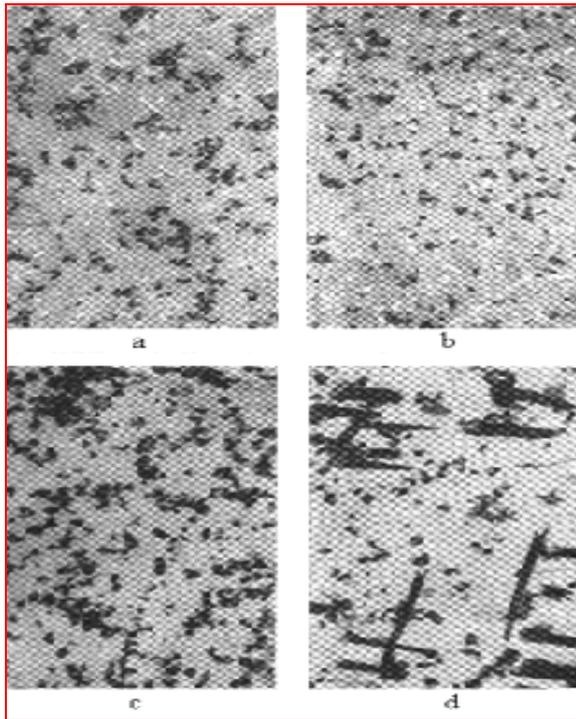


Fig. 4 Structure of alloy ATSi<sub>7</sub>Mg(10000:1) aged: a-185°C/15h, b-200°C/10h, c-300°C/10h, d-300°C/100h

#### ■ INTERPRETATIONS

In work [8], [9] it shows that the ternary alloy system Al-Si-Mg, were first observed in aluminum matrix areas which characterize stages of ante-separation. There not was established neither by X-ray observations the differences in areas structure for aging alloys. Despite lack evidence of structural changes, increased of mechanical properties of ternary alloys is a fact. Only at a temperature of 150°C authors [9] in 1958 established that the separation distributed locally of Mg and Si take place.

It is believed (with network vacancies which are formed during the hardening process) atoms of alloying elements Ea begin to be collected in the chains without any order, after which the atoms slowly sits in an order determined the by network parameter (4.04 Å) and the chain gets the same format with the elementary cell of the matrix. At high temperatures the atoms of Ea formed construction areas least different of the matrix. It shows [9] that this phase β'' move gradually in the phase β' rebuilding the crystalline matrix is accompanied by a strong

distortion which is the main cause of increasing the mechanical properties of alloys siluminium. But such a tensioned state of the crystalline network helps to reduce refractory of alloys. This is observed as a strong fact, in changing the structure of α solid solution alloy type ATSi<sub>7</sub>Mg at 165°C in the ageing process where the decomposition of α solid solution takes place relatively quickly.

Figure 1 shows the solid solution alloy ATSi<sub>7</sub>Mg in which ageing at 135°C for 15 hours produce formation and deposition of fine dispersed elemental Si [5]. In addition to this Si there are deposits in the form round (white points) probably the Guillet areas or how to say „phase β''

We say that such products of the decomposing solid solution which is formed as chains in the alloys Al-Mg-Si is characteristic for the initial stage of aging. The structure of ATSi<sub>7</sub>Mg aged at 150°C for 15 h (Figure 1.b) confirms the words [16].

At higher temperatures the return process and the size of elementary high dispersed Si particles and a separation (white point) increase dramatically. (Figure 2). Structure of α solid solution after aging for 15 and 25 h (Figure 2 a, b) at 165°C has many deposits of Si and formation of β'' metastabile phase, and even the stable phase Mg<sub>2</sub>Si (fig. 2 c)

From Figures 2 and 3 it is clear that with increasing aging temperature there is the decomposition of solid solution α is very intense and is formed by deposition metastabile phases that increase substantially with aging time. Very intense decomposition α solid solution had place at 175 °C with the maintenance of 10 h.

The figure 4 shows a large amount of fine and small and many particle high dispersed portions of Si<sub>1</sub> (primary) that were formed after reset the network. Particles Mg<sub>2</sub>Si (in the form of narrow white strips) are shown oriented.

Very suggestive is the alloy ATSi<sub>7</sub>Mg old aged at 185°C for 15 h (Figure 1 a). But I clearly see this in Figure 1 b α solid solution decomposition at the aging temperature of 200 °C, virtually ends after 10h. This produce reduced resistance of alloy ATSi<sub>7</sub>Mg at temperature of 200 °C.

■ CONCLUSION

Technological processes of casting under pressure are widespread in the industry. The process ensures a quality cast alloy type siluminium such as good walls and lack risk of mechanical cracks at hot state and cold state. The proprieties of cast alloys type siluminium can be improved by thermal treatment named artificial aging. There are many ways to make these treatments. These have resulted in changing the structure of alloy, with the apparition  $Mg_2Si$  phase (composed intermetallic component). This has an effect to increase mechanical resistance

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## **REGISTRATION AND PROCESSING OF FUNCTIONAL PARAMETERS VALUES FOR INTERNAL COMBUSTION ENGINES**

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### ■ **Abstract:**

*The article represents a study regarding the creation of a correlation between the functional parameters of the internal combustion engines, both diesel and petrol ones, with the help of the MATLAB mathematic software. The values of these parameters were registered with the help of the mega macs 55 equipment, in real time, the motor vehicles running in urban traffic.*

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### ■ **Keywords:**

*internal combustion engine, correlations, mathematic software, intelligent diagnosis, OBD*

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### ■ **INTRODUCTION**

*The best results in tracking down defects immediately after their appearance can be reached if the motor car systems performance is permanently supervised, which involves the development of certain on board diagnosis techniques and equipment. Their evolution has been and is closely linked to the evolution of motor car construction. Thus, the appearance of microprocessor-operated systems has enabled a considerable increase in the number of objectives monitored and the number of registered and analyzed parameters.*

*The OBD (On Board Diagnostic) system monitors the engine performances and evacuation emissions, including the self-test sensors during vehicle running, to make sure it works. The board computer can identify a problem before it is tracked down by the vehicle driver, warning him/her about the failure by displaying a bright light. Most bright witnesses*

*will display "Check Engine," "Service Engine Soon" or an engine symbol.*

*As soon as the OBD detects a problem, a failure code (error) is registered in the motor vehicle computer. When the vehicle is placed on an OBD I/M checking tester, this code will help the technician track down and repair the defect.*

*OBD-II is a new standard introduced in the second half of the '90, insuring the engine and chassis, equipment accessories and car installation control almost entirely. OBD II is an extensive set of standards used by SAE, and adopted by EPA and CARB (California Air Resource Board).*

*Certain motor vehicle models equipped with OBD-II are not 100% compatible. There are three basic OBD-II protocols used, each with minor variations of the communication model between the board computer and scanning outtrigger.*

*Based on the OBD-II protocols, and connecting a mega macs 55 tester, the main functional parameters were registered for two types of*

engines. These values were transferred to the MATLAB mathematic software, with whose help different correlations were created.

**ENGINE TESTING**

The study was conducted on two different engines, petrol and diesel, and the data were obtained with the help of the mega macs 55 equipment from Gutmann company. The diagnosis of the engine management was made in urban traffic, the equipment being connected through the OBD coupling to the engine command central unit. The data prevailed are displayed in the form of the data shown in the pictures below.

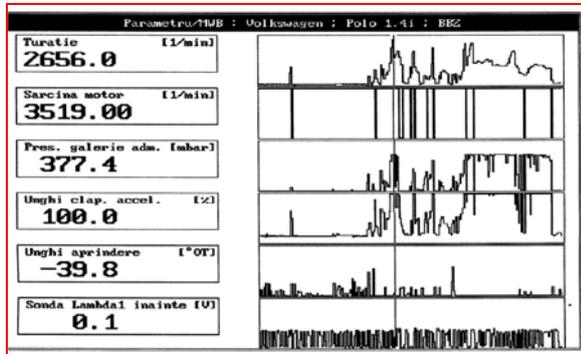


Figure 1. VW Polo, 1.4i engine

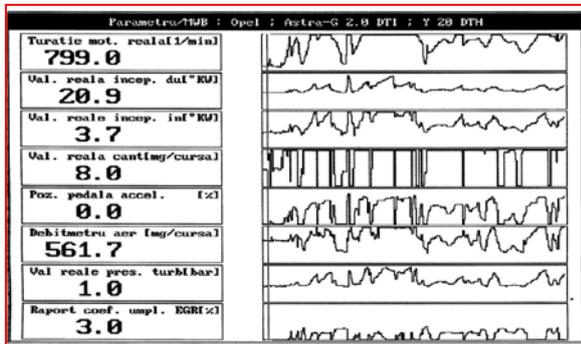


Figure 2. Opel Astra 2.0 DTI engine

As it can be observed, the system allows the registration of the engine functional parameters in graphic form, and by moving the cursor along the abscissa, in the left side of the display one can see the actual values of these parameters at a certain point in time.

**PROCESSING OF EXPERIMENTAL DATA**

Following the measurements made in traffic, in a 15 minute interval, the data were introduced in a specialized processing program, thus a series of correlations being made, from which

conclusions can be drawn referring to engine running in different revolutions and charges specific to urban traffic.

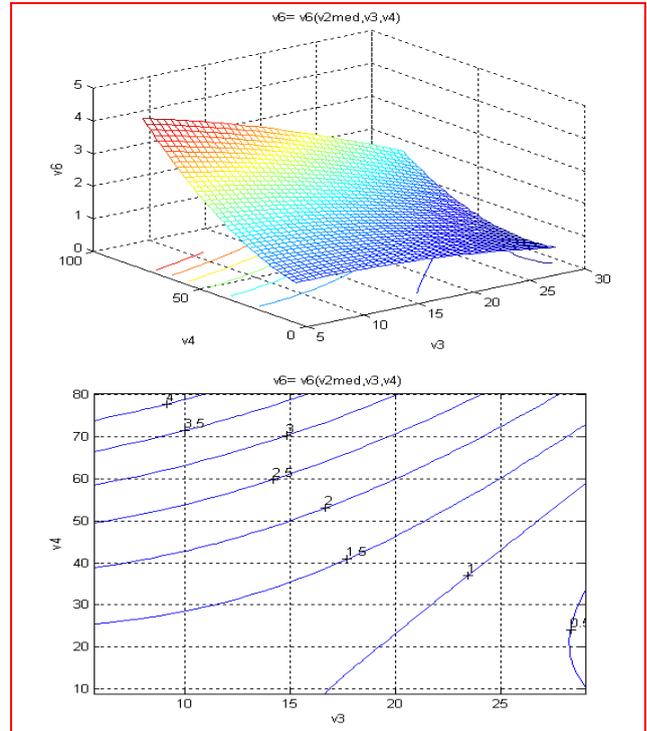


Figure 3. Real value of the oversupply pressure ( $v_6$ ) function of the real quantity injected ( $v_3$ ) and the acceleration lever position ( $v_4$ ) for the Opel Astra engine

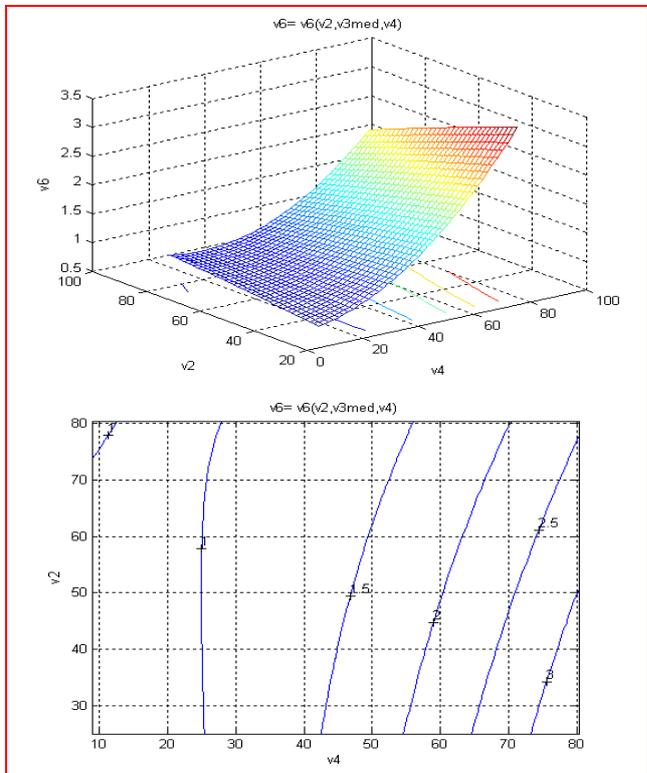


Figure 4. Real value of the oversupply pressure ( $v_6$ ) function of the real advance in the injection ( $v_2$ ) and the acceleration lever position ( $v_4$ ) for the Opel Astra engine

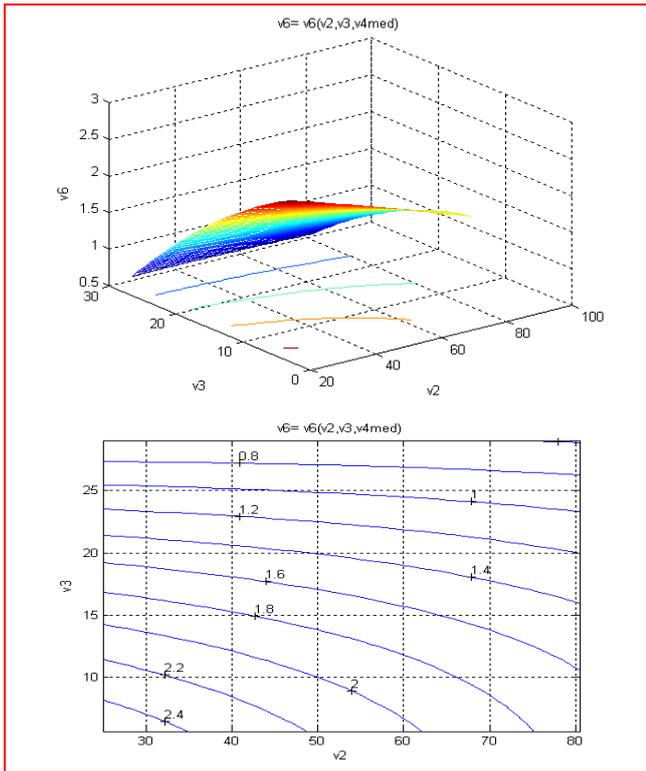


Figure 5. Real value of the oversupply pressure ( $v_6$ ) function of the real advance in the injection ( $v_2$ ) and the real quantity injected ( $v_3$ ) for the Opel Astra engine

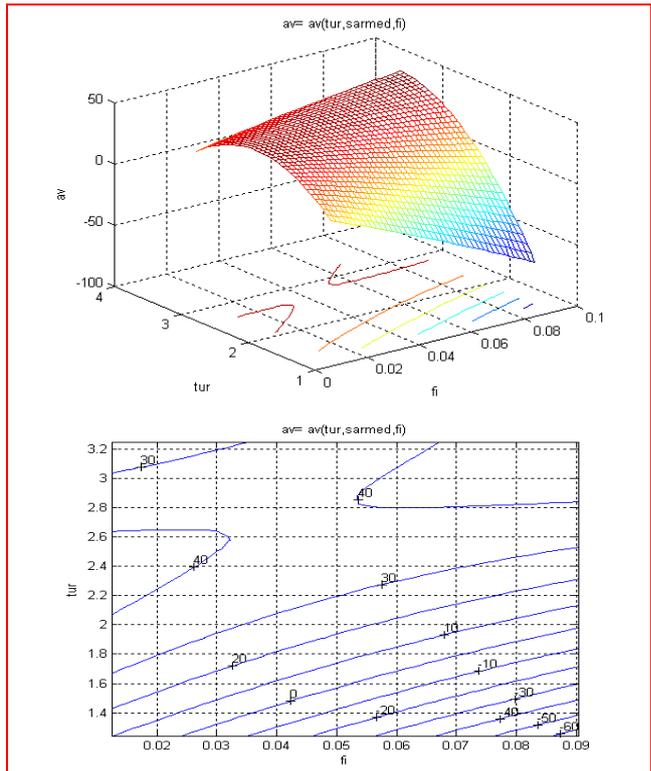


Figure 7. Value of the advance function of revolution and the acceleration choke opening angle for the VW Polo 1.4i engine

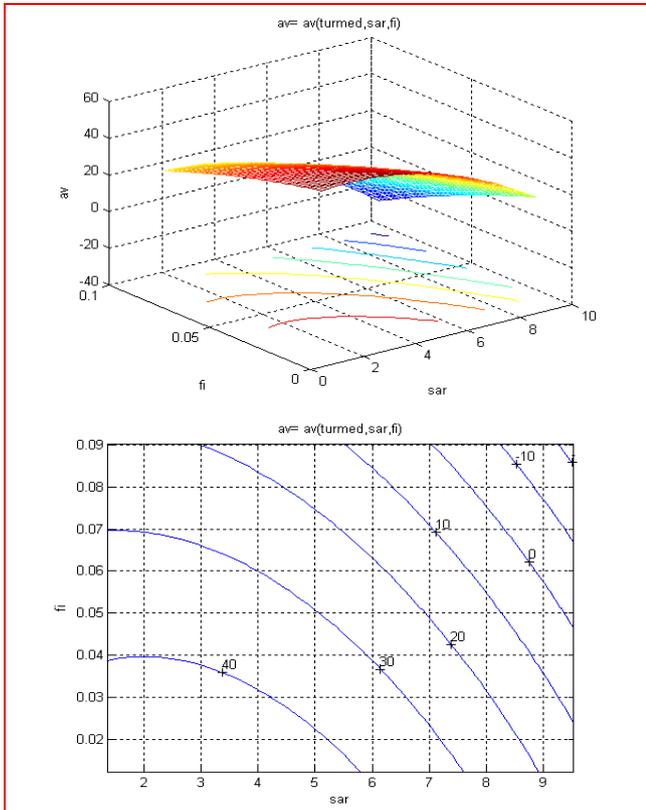


Figure 6. Value of the advance function of load and the acceleration choke opening angle for the VW Polo 1.4i engine

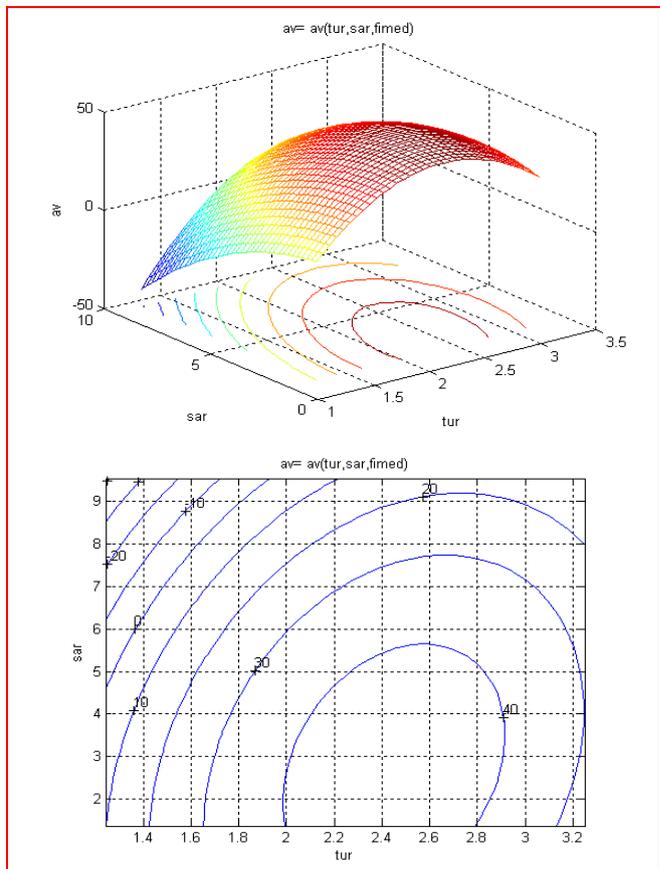


Figure 8. Value of the advance function of revolution and load for the VW Polo 1.4i engine

*The study was conducted on the diesel engine fitted on the Opel Astra model and on the VW Polo 1.4i petrol engine.*

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**■ ANALYSIS OF RESULTS AND CONCLUSIONS**

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*The registration system of the engine functional parameters allows only the sequence visualization of the prevailed data, based on which conclusions can be drawn regarding the functioning of different components.*

*Once these data are introduced in a specialized processing program, they can offer global information regarding the correlations which the command electronic unit makes during engine running between the different components that interact with one another.*

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## **DESIGN OF SEQUENCE DIAGRAMS FOR IMPLEMENTATION OF A DYNAMICAL SOFTWARE FOR DOING GEOMETRICAL CONSTRUCTIONS**

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### ■ **Abstract:**

*This paper presents a software package, which can be used as educational software. The informatics system, including modern methods and techniques, will lead the subject which is using it to gain experience in understanding and managing the knowledge from geometry field and will offer the comfortable and efficient access to the newest information and knowledge. The investigation can be oriented towards reaching of some precise purposes or can be an exploration.*

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### ■ **Keywords:**

*UML, Sequence Diagram, Educational Software*

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### ■ **INTRODUCTION**

*Unified Modeling Language (UML) is a standardized general-purpose modeling language in the field of software engineering [1]. UML includes a set of graphical notation techniques to create abstract models of specific systems.*

*The Unified Modeling Language (UML) is an open method used to specify, visualize, construct and document the artifacts of an object-oriented software-intensive system under development. UML offers a standard way to write a system's blueprints, including conceptual components such as: actors, business processes, system's components and activities, as well as concrete things such as: programming language statements, database schemas and reusable software components.*

*UML combines the best practice from data modeling concepts such as entity relationship diagrams, business modeling (work flow), object*

*modeling and component modeling. It can be used with all processes, throughout the software development life cycle, and across different implementation technologies. UML has succeeded the concepts of the Booch method, the Object-modeling technique (OMT) and Object-oriented software engineering (OOSE) by fusing them into a single, common and widely usable modeling language. UML aims to be a standard modeling language which can model concurrent and distributed systems. UML is not an industry standard, but is taking shape under the auspices of the Object Management Group (OMG). OMG has initially called for information on object-oriented methodologies, that might create a rigorous software modeling language. Many industry leaders have responded in earnest to help create the standard.*

*UML models may be automatically transformed to other representations by means of QVT-like transformation languages, supported by the OMG. UML is extensible, offering the following*

mechanisms for customization: profiles and stereotype.

UML is not a development method by itself, however, it was designed to be compatible with the leading object-oriented software development methods of its time. Since UML has evolved, some of these methods have been recast to take advantage of the new notations (for example OMT), and new methods have been created based on UML. The best known is IBM Rational Unified Process (RUP). There are many other UML-based methods like Abstraction Method, Dynamic Systems Development Method, and others, designed to provide more specific solutions, or achieve different objectives.

It is very important to distinguish between the UML model and the set of diagrams of a system. A diagram is a partial graphical representation of a system's model. The model also contains a "semantic backplane" — documentation such as written use cases that drive the model elements and diagrams.

UML diagrams represent two different views of a system model [2]:

- ✚ *Static view: Emphasizes the static structure of the system using objects, attributes, operations and relationships. The structural view includes class diagrams and composite structure diagrams.*
- ✚ *Dynamic view: Emphasizes the dynamic behavior of the system by showing collaborations among objects and changes to the internal states of objects. This view includes sequence diagrams, activity diagrams and state machine diagrams.*

UML models can be exchanged among

## ■ SEQUENCE DIAGRAMS

A sequence diagram in Unified Modeling Language (UML) is a kind of interaction diagram that shows how processes operate with one another and in what order [3]. It is a construct of a Message Sequence Chart. Sequence diagrams are sometimes called Event-trace diagrams, event scenarios, and timing diagrams.

A sequence diagram shows, as parallel vertical lines, different processes or objects that live simultaneously, and, as horizontal arrows, the messages exchanged between them, in the order in which they occur. This allows the

specification of simple runtime scenarios in a graphical manner.

The UML 2.0 Sequence Diagram supports similar notation to the UML 1.x Sequence Diagram with added support for modeling variations to the standard flow of events.

If the lifeline is that of an object, it is underlined. Note that leaving the instance name blank can represent anonymous and unnamed instances.

In order to display interaction, messages are used. These are horizontal arrows with the message name written above them. Solid arrows with full heads are synchronous calls, solid arrows with stick heads are asynchronous calls and dashed arrows with stick heads are return messages. This definition is true as of UML 2, considerably different from UML 1.x.

Activation boxes, or method-call boxes, are opaque rectangles drawn on top of lifelines to represent that processes are being performed in response to the message (Execution Specifications in UML). Objects calling methods on themselves use messages and add new activation boxes on top of any others to indicate a further level of processing.

When an object is destroyed, an X is drawn on top of the lifeline, and the dashed line ceases to be drawn below it (this is not the case in the first example though). It should be the result of a message, either from the object itself, or another. A message sent from outside the diagram can be represented by a message originating from a filled-in circle ("found message" in UML) or from a border of sequence diagram ("gate" in UML).

UML 2 has introduced significant improvements to the capabilities of sequence diagrams [4]. Most of these improvements are based on the idea of interaction fragments which represent smaller pieces of an enclosing interaction. Multiple interaction fragments are combined to create a variety of combined fragments, which are then used to model interactions that include parallelism, conditional branches, optional interactions etc.

Some systems have simple dynamic behavior that can be expressed in terms of specific sequences of messages between a small, fixed number of objects or processes. In such cases sequence diagrams can completely specify the system's behavior. Often, behavior is more complex, e.g. when the set of communicating objects is large or highly variable, when there are many branch points (e.g. exceptions), when

there are complex iterations, or synchronization issues such as resource contention [5]. In such cases, sequence diagrams cannot completely describe the system's behavior, but they can specify typical use cases for the system, small details in its behavior, and simplified overviews of its behavior.

**PRESENTATION OF SEQUENCE DIAGRAMS UTILIZED TO IMPLEMENTATION OF A DYNAMICAL SOFTWARE FOR DOING GEOMETRICAL CONSTRUCTIONS**

In the achievement of the interactive informatics system designed for studying geometry were aimed the following purposes:

- ▣ presenting of theoretical concepts and main results;
- ▣ interactive presentation of applications for each required subdomain;
- ▣ achievement of accurate drawings by replacing the pencil and ruler with the mouse.

By representing the diagrams related to the three steps: analysis, designing and implementation, the interactive informatics system will be described in a clear and concise manner. Utilization of the UML modelling language in the diagrams' achievement is featured by a rich syntactic and semantic rigour, and support for visual modeling.

The sequence diagram is used primarily to show the interactions between objects in the sequential order that those interactions occur. Much like the class diagram, developers typically think sequence diagrams were meant exclusively for them..

The diagram illustrates in figure 1 shows the interactions between objects, which have as purpose the drawing of a parabola. One can notice that there are interactions between nine objects, out of which the objects of `Vector<Element2D>`, `Desen2D` and `Graphics2D` type are already created, and the objects of `Element2D`, `Punct2D`, `Dreapta2D`, `MouseEvent` and `Parabola2D` type will instantiate during the interactions.

The diagram illustrates in figure 2 shows the interactions between objects, which have as purpose the drawing of a hyperbola. One can notice that there are interactions between eleven objects, out of which the objects of `Vector<Element2D>`, `Desen2D`,

`Vector<Punct2D>` and `Graphics2D` type are already created, and the objects of `Element2D`, `Parametru`, `Punct2D`, `MouseEvent` and `Hyperbola2D` type will instantiate during the interactions.

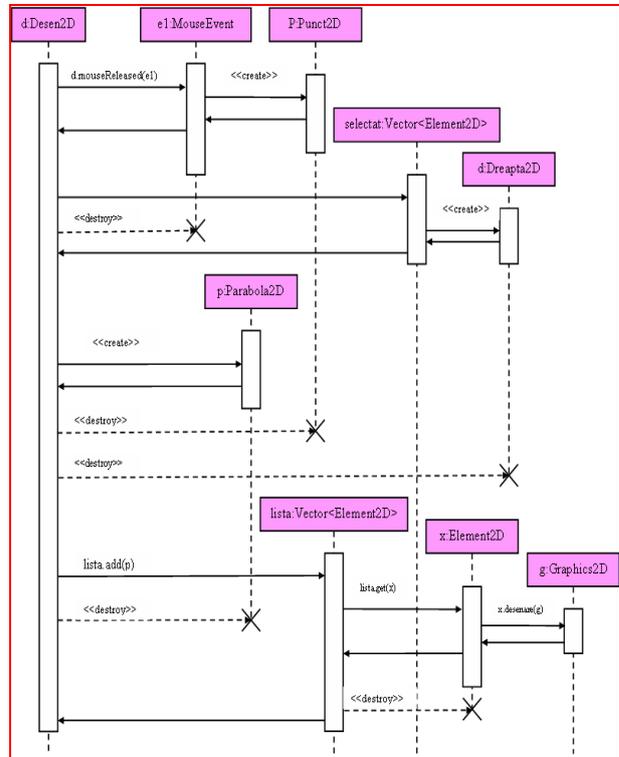


Figure 1. Sequence diagram for drawing a parabola

The diagram illustrates in figure 3 shows the interactions between objects, which have as purpose the drawing the normal to a hyperbola. One can notice that there are interactions between nine objects, out of which the objects of `Vector<Element2D>`, `Desen2D` and `Graphics2D` type are already created, and the objects of `Element2D`, `Punct2D`, `Dreapta2D`, `MouseEvent` and `Hiperbola2D` type will instantiate during the interactions.

These objects are represented on Ox axis and, on Oy axis, are represented the messages ordered increasingly in time. At the beginning, the execution's control is undertaken by the object of `Desen2D` type which creates an instance of the `MouseEvent` class.

Now, the control is undertaken by this newly created instance that will allow to determining a point. Giving the control to the object of `Hiperbola2D` type, will verified if the created point belong to the hyperbola.

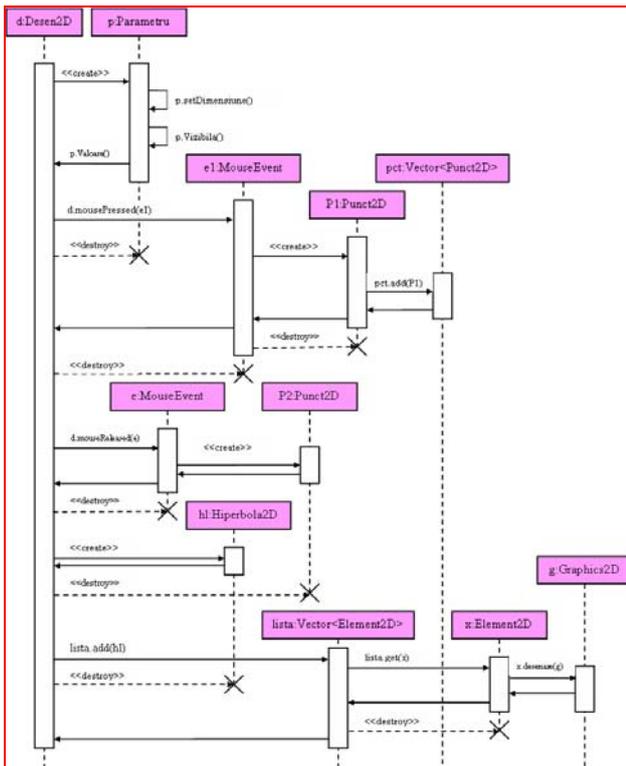


Figure 2. Sequence diagram for drawing a hyperbola

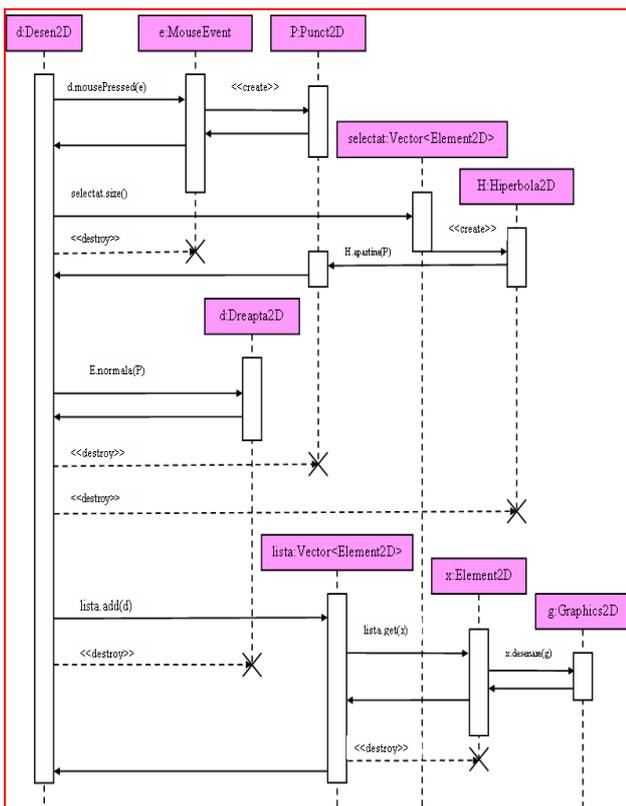


Figure 3. Sequence diagram for drawing a the normal to a hyperbola

Giving back the control to the object of Desen2D type, further will be instantiated the object of Dreapta2D type, representing the normal to hyperbola, then will be destroyed the object of

Punct2D type and the object of Hiperbola2D type.

Further, the execution's control is transmitted to the object of Vector<Element2D> type, in order to add the normal previously created in the list of 2D elements of the geometric construction, and then will be destroyed the instance of the Dreapta2D class. Finally, will be redrawn the geometric construction, which will include now also the normal to the previously created hyperbola by using the object of Graphics2D type.

**CONCLUSION**

The diagrams were achieved by an approach in a new manner, multidisciplinary, of the informatics application, including both the modern pedagogy methods, and the components specific to the discipline to be studied.

Thus, was achieved the connection between the didactic actions and the purposes and objectives scientifically established, by elaborating of new methods and assimilating of new means, capable to increase the school efficiency, allowing the pupils and students to acquire the system required by knowledge's and their application techniques in conditions as optimal possible.

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## **PREDICTION OF THE SIGNALS USING THE NEURONAL NETWORKS**

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### ■ **Abstract:**

*This paper work refers to the prediction problems which are used with the help of the neuronal networks. The network is made of a neuron whose function is linear and who has the past few 5 input values of the useful signal  $x(t)$  – this signal must be predicted.*

*The training algorithm is Widrow-Hoff. This algorithm decreases the number of square errors between the output of the network and the required value, and it eventually establishes the “weight” factor.*

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### ■ **Keywords:**

*Prediction, algorithm, neuronal networks, signal*

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### ■ **INTRODUCTION**

*This identification [2], [3] is based on some neuronal methods and it has been lately used a research method due to mathematical research about the approximation properties of the neuronal networks - MLP (Multilayer Perceptron) and RBF (Radial-Basis Function) type [1]. The development of this new domain has been spectacular due to a remarkable contribution of some Automatics scientists. They have used the MLP networks for the non-linear identification and they have decided to use the RBF-type patterns. Thus, we have to point out the fact that the most important automatic application of those techniques, who are specific for the neuronal networks, is the use of the MLP features with sinoid nodes inside the hidden layer(s). On the other hand, those companies who produce technical-scientific software have begun developing specific facilities for the neuronal networks, so that the first version of the Neuronal Network Toolbox (NNT) should be*

*enclosed in the MATLAB 4.2 environment – it had a major impact on the interest of the automatics specialists. NNT, from the earliest to the most recent version, has been designed to cover a range of applications of the neuronal networks, the designers had no intention to develop the Simulink blocks simultaneously [4]. These blocks are used for designing dynamic patterns.*

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### ■ **NEURONAL NETWORKS. TRAINING NEURONAL NETWORKS**

*The neuronal networks can be made of simple processing elements, such as perceptrons or neuronals (Figure no. 1), and they make up one-layer networks, or of multiple elements and they make up multi-layer networks [1]. All these network-types enclose some elements that are distributed within the connection „weights” amongst different layers that make up each network [6]. The properties of the neuronal networks are: contain memory, shape*

acknowledgment, control and identification of the non-linear processes, etc. These properties are obtained through learning, such as in the case of the physiological systems. Specific training algorithms could be used in order to determine the values of those weights/ercentages who represent the solution to the problems we solve by using the neuronal networks. The training algorithms could be divided in two separate categories: supervised instruction methods and non-supervised instruction methods. In the case of those methods belonging to the first category, the instruction is called supervised because we know both the input and the output sizes. The system is shaped up with the help of a neuronal network and the weight amongst the layers have random values. By comparing the input sizes that we already know and those of the output of the network (after we have used the input data set), we get an error signal. This signal helps us establish and adjust the weights amongst the layers of the network, in order to diminish a performance criterion [8].

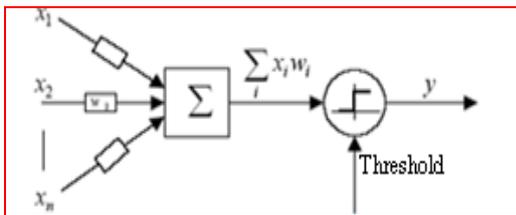


Figure 1 Classic perceptron model for neuronal networks

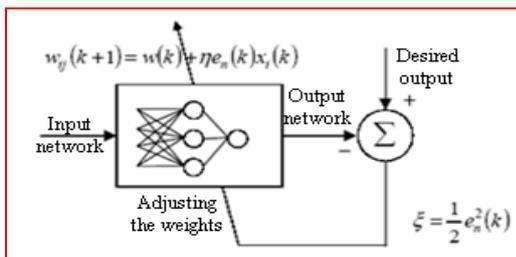


Figure 2 Supervised instruction mechanism

The non-supervised learning methods do not uses already-known input sizes during the training stage of the neuronal network, by using only the input sizes for adjusting the weights. Thus, we can establish some input categories who correspond to some inputs from the data set, or „winner take all” outputs – in this case, the output neuron who has the highest activity wins and turns active, meanwhile the others do not work. This method is called self-organisation

and we could use it successfully in matters of shape acknowledgement.

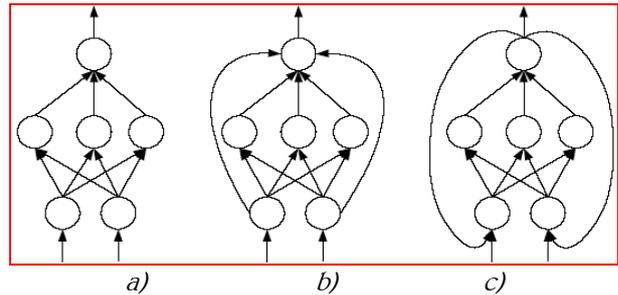


Figure 3. „Feed forward” neuronal networks topologies a), b) and „feedback” neuronal networks topology c)

According to this topology, the artificial neuronal networks could be classified in two categories - „feedback” and „feed forward”. In the case of a „feed forward” network the neuronal output is sent to other neurons who do not receive any information from the input neurons from the surface layers - Figure 3 a) and b).

### NEURONAL NETWORKS USED FOR SIGNAL PREDICTION

The design of the linear prediction neuron is described in Figure 4. The network is made of a linear active neuron and the input receives the last five values of the useful signal  $x(t)$  - this signal must be predicted [4], [7].

We write the matrix  $P$ ,

$$p = [x(t) \ x(t-1) \ x(t-2) \ x(t-3) \ x(t-4)],$$

and the five delay values of the  $x(t)$  signal, who are going to be represented at the input of the neuronal network. The matrix and the values are going to represent the data we need for the supervised training, by using the Widrow-Hoff algorithm. This algorithm decreases the sum of the square errors between the output and the required value, and establishes the weight vector who is able to solve the problem..

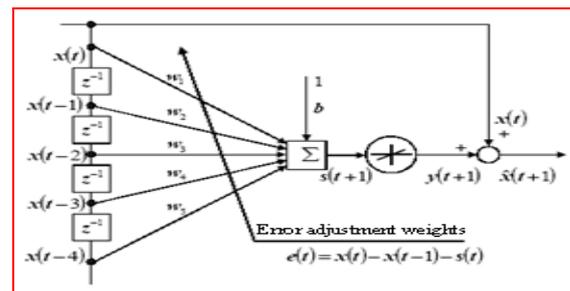


Figure 4 Linear prediction neuron

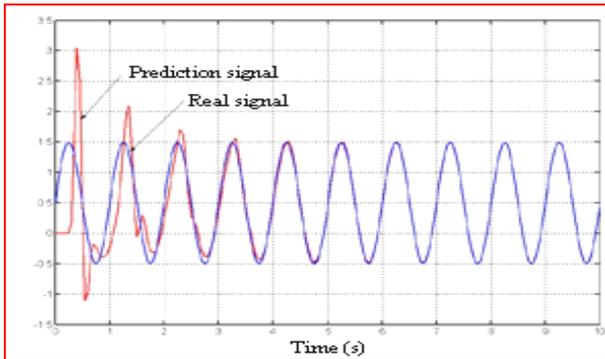


Figure 5 The proposed sinusoidal signal (blue) and the network predicted signal (red)

We consider a sinusoid signal  $x(t) = 0.5 + \sin(2 \cdot \pi \cdot t)$  - in Figure no. 5 it is coloured in blue. The learning ratio of the training algorithm is  $\eta = 0.1$ , considering that it is constant during the training process. The network turns active and the training algorithm is used for a period of 200 steps. We could see that after about 100 repetitions the network is able to predict the signal we propose - Figure no. 5, where the red signal represents the output of the neuronal network during the training process. Figure no. 6 describes the prediction error - the difference between the real and the predicted signal. This signal tends to reach 0 after a certain time.

Figure no. 7 describes the values of the simple perception weights during the training process. The identification time of the process lasts according to the value we choose for the learning ratio. If we want a faster identification then, the value must be increased, but the values we have estimated during the first stages reach important values. We could also use another training method that should vary the learning ratio throughout the process, for improving the methods.

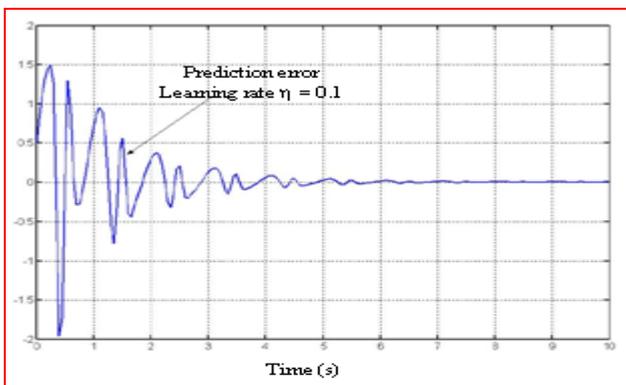


Figure 6 Prediction error between the real and predicted signal

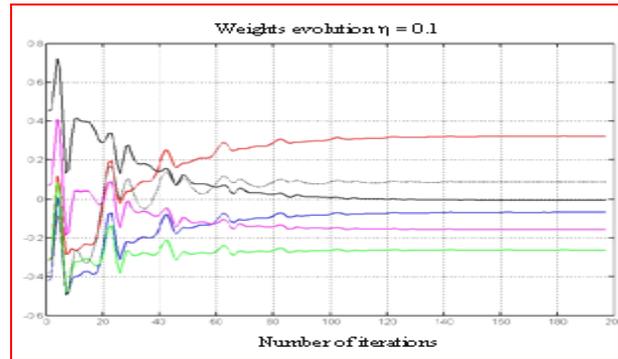


Figure 7 The evolution of the weights during the training process

## CONCLUSION

All the neuronal networks could be made of simple processing elements, such as perceptions or neurons, so they should make up some single-layer networks, or made of several elements and they should make up some multi-layer networks. The „information” within all these networks is distributed within the connection weights amongst the different layers that make the network. Studies have proven that the prediction of the neuronal networks signals is extremely effective.

This paper work has described the linear neuron used for predictions, the training process, and the results we had obtained. The network is made of one neuron, according to the linear active process, which has the last five input values we have to predict.

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## **MANAGING PRODUCTION ACTIVITIES USING THE BALANCED SCORECARD STRATEGIC MANAGEMENT SYSTEM**

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### ■ **Abstract:**

*The use of an adequate management method can ensure organizational success. If until now the focus was on the financial success of organizations, now more and more important are the customers, employees, collaborators. The Balanced Scorecard (BSC) is a strategic management system that manages the company's activities depending on its vision and strategies. Within the management instrument, the Balanced Scorecard analyses the four perspectives: the customers, learning-development, internal processes and the financial field.*

*The Balanced Scorecard looks at a business strategy from all perspectives and allows the division of the strategic objectives in individual objectives and actions down to the last operational level. The BSC can contain both quantitative and qualitative objectives.*

*For the present-day organizations information is no longer the basic component. Because the organizations administer a too big volume of data and information, the manner in which the relevant information is selected and used within the organizational actions and in decision-taking is of extreme importance. The ecosystem that underlies a Balanced Scorecard is made up of visions, missions, organizational values and competences, strategies.*

*The work deals with the way in which organizations should choose the BSC solution which meets the company's requirements best so as to fulfill its individual needs.*

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### ■ **Keywords:**

*Management, organization, balanced scorecard, strategy*

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### ■ **THEORETICAL CONSIDERATIONS**

*The leaders of modern organizations are confronting with a series of challenges, generated in the first place by the extremely dynamic character of the world in which we live. In order to keep up with the people around, it is necessary to create a permanent alignment to the novelties appeared on the economic*

*market, but also in the IT field. We are living in the century of speed, everything we do needs speed and precision, that is why all the activities undertaken tend to be automated.*

*The use of an adequate management method can ensure organizational success. If until now the focus was on the financial success of organizations, now more and more important are the customers, employees, collaborators.*

Within the management instrument, the Balanced Scorecard analyses the four perspectives: the customers, learning-development, internal processes and the financial field.

The Balanced Scorecard (BSC) is a strategic management system that manages the company's activities depending on its vision and strategies. This concept was presented for the first time in the 1992 February issue of Harvard Business Review by professors Robert Kaplan and David Norton.

The concept of Balanced Scorecard was developed in the early 1990's by Robert S. Kaplan and David P. Norton. They describe this innovation as follows: "The balanced scorecard retains traditional financial measures. But financial measures tell the story of past events, an adequate story for industrial age companies for which investments in long-term capabilities and customer relationships were not critical for success. These financial measures are inadequate, however, for guiding and evaluating the journey that information age companies must make to create future value through investment in customers, suppliers, employees, processes, technology, and innovation."

At the highest conceptual level, the BSC is defined as "a frame that helps organizations to transpose the strategy on operational objectives so as to control both the organizational behavior and performance" [1].

The system consists in 4 processes:

- ✚ The transposition of the vision on operational objectives;
- ✚ The communication of the vision and its connection to individual performances;
- ✚ Business planning;

Feedback, learning and strategy adjustment depending on the course.

The Balanced Scorecard looks at a business strategy from all perspectives and allows the division of the strategic objectives in individual objectives and actions down to the last operational level. The BSC can contain both quantitative and qualitative objectives.

The strongest point of this instrument is the fact that it binds long-term strategic objectives with short-term actions. Most control and management systems of companies are built around financial indicatives and targets which place little emphasis on the long-term strategic objectives, thus a discrepancy being created

between strategy elaboration and its implementation.

The managers who use the BSC do no longer count only on the short-term financial indicatives to evaluate company performances. The BSC allows them to use the 4 processes which, used separately or together, contribute to the correlation of long-term objectives with the short-term actions [2].

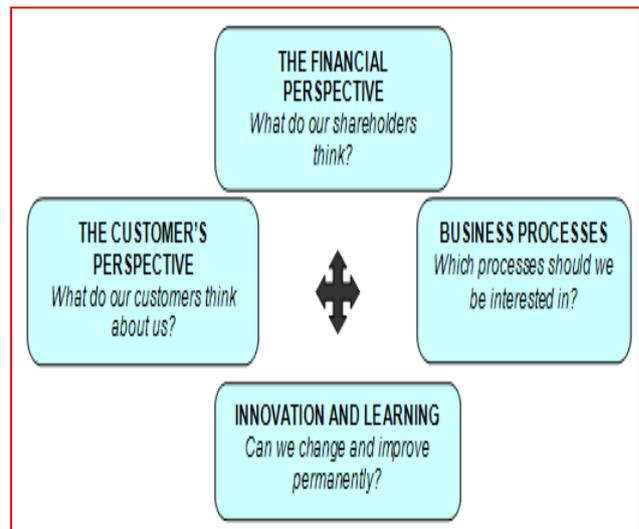


Fig. 1. The BSC principle from the 4 perspectives [1]

The first process, "Vision translation" is the process which helps managers reach consensus in the organization regarding organization vision and strategy. Most times, despite the good intentions of top-management, assertions of the following type: the best in the x category, number 1 supplier, cannot be easily translated in operational terms which deliver action directions at the local level. So as people to act according to the statements from the vision and strategy, they must be expressed in an integrated set of objectives and measures, agreed upon by all the executive directors, which should describe the success factors on the long-term.

The second process, "Communication and relating", allows managers to communicate their strategy upward and downward the organization steps and to tie it to individual objectives and the department objectives. Traditionally, the departments are evaluated according to the financial performances and the financial motivations are tied to the short-term financial objectives. The BSC gives managers the certainty that all the organization levels understand the long-term strategy and that both the individual

objectives and the departmental ones are in line with it.

The third process, "Business Planning", makes it possible for companies to integrate their financial and business plans. Almost all companies implement changing plans, each with their managers and project counselors, competing for the executive seniors' time, energy and resources, frequently leading to disappointments regarding the program result. But when the managers use ambitious objectives for the BSC, as a means for resource allotment and priority settlement, they can understand and coordinate those initiatives which lead to the long-term strategies previously set.

"Development and learning", the fourth BSC process offers the company the possibility of strategic learning. The existence of feedback and the process evaluation focused on the company, its departments or the individual employees, ensures meeting the financial objectives previously set.

#### **THE BSC WITHIN THE ORGANIZATION**

The BSC offers a valuable instrument to the employees for a better perception of the organizational environment. It also supplies information to the management when the organization starts to document itself and develop the control measurement indicatives, which will shortly lead to reaching the desired goals and fulfilling the organizational visions.

The result is that the day-to-day operations are created starting from a common point of view about where the organization is heading to on the long-term. If the scorecard is segmented on activity areas, the operation control will be perceived as being a lot more relevant than in the previous models. The employees will become more cooperative and motivated and thus more open to change and decided to implement the new decisions of the organization.

Thus, the organization becomes more open to the learning process, more receptive and it is developing its competences permanently.

All this make it necessary for the scorecard to be introduced and used continuously in best conditions. Taking into consideration the fact that the use of the scorecard is simple, the resource involvement and top management contribution are often underestimated. The

scorecard project is easily perceived as a more elaborated project on the measurement of organization performances. It can also meet with opposition from the employees, who could see in this project only a method of work inspection. So, how can then this process be conceived so as to avoid these impediments? The following structure can be used [3]:

- ✚ For what type of activities must the scorecards be created? The first decisions which must be reached are connected to the starting point. The scorecard usefulness for nonprofit organizations is also taken into consideration: personnel units, governmental agencies, etc.
- ✚ Initial scorecard development. Launching the project in the adequate direction is of vital importance.
- ✚ Scorecard introduction and use – process visualization. Continuing the previous item, the wished connection between strategy through control and learning and back to strategy is shown.

Only by continuous use of the scorecards can real wins be obtained for the organization. In this stage, the support for the project can decrease, because the managers believe that the scorecards have been introduced successfully.

#### **THE ADVANTAGES AND DISADVANTAGES OF THE BSC**

Balanced Scorecard is a tool of management which facilitates making decisions and gathers a coherent set of indicators which provide high directives and the responsible functions. It is also a comprehensive vision of the business and its area of responsibility. The information contributed by the BSC allows to focus on the directive equipment, on the units of business, on the resources and the processes with the strategies and organization.

The Balanced Scorecard has proven to be an efficient management work frame. It has the following functions [1]:

- ✚ Transforming strategy into action;
- ✚ Aligning the organization to the strategy;
- ✚ Strategy performance as everybody's task;
- ✚ Continuity of strategy performance;

The system is the basis of the organization's strategic success, but the strategy is implemented through initiative, innovation processes, by

heading the activities in the direction of organization development.

The following ten assertions come to support the argumentation of using the Balanced Scorecard method:

1. Cost reduction, productivity increase;
2. Such a valuable measurement system enables an organization to align its activity to the suggested strategy. With this system, the organization can receive the desired answer so as to guide its future actions.
3. The measurement of process efficiency enables a rational settlement of the process fulfillment order.
4. Enables managers to identify the best practices for activity performance.
5. The information obtained based on the system allow quicker and better budget decisions, and also offer control on the processes made in the organization. It can also reduce the risk.
6. The accountancy and the financial department are working with concrete data.
7. Performance indicatives are obtained, which can be compared with the financial results of the competition, thus setting the organization situation and position.
8. The estimation of future costs can be done with great accuracy, all this due to the experience gained in previous projects.
9. The method allows the measurement of performances and initiatives following the strategy.
10. The system makes it possible to measure the indicatives and to determine the likelihood of their increase in value.

Since its first appearance in 1992, the Balanced Scorecard concept has been adopted as a new approach of the control management both in business and by governments.

It is used to describe the ambitions and achievements of the organization. It has proven useful for [2]:

- ✚ Communicating the strategy of both the employees and managers;
- ✚ Fulfilling the activities that follow the strategy before the fulfillment of the activities whose end is to meet current needs;
- ✚ Monitoring and awarding these activities;

The Balanced Scorecard is based on the following principle: "doing the things that are

necessary, doing them properly, rewards will be obtained in the future".

The benefits of using this method can be synthesized as follows:

- ✚ The Balanced Scorecard contributes to aligning the performance indicatives with the strategy at all organization levels;
- ✚ Offers management a full business image;
- ✚ The method facilitates communication and understanding the business goals as well as the strategy at all organization levels;

Some authors state that the system is not a new method of measuring and interpreting a firm's situation, but rather a logical presentation of what has to be done so as to follow the chosen strategy. The Balanced Scorecard is an organized split work frame which enables the strategy implementation and fulfillment at all the levels of an enterprise by binding the initiative with the objectives and actions. The system offers a full image of the enterprise performance, combining the financial indicatives with other important performance indicatives within the relationships with customers, internal processes, research and development.

As any other method, the Balanced Scorecard has certain disadvantages:

- ✚ This approach is not fix, it takes a lot of time to define a set of scorecards;
- ✚ The implementation of a Balanced Scorecard system in an organization implies the detailed study of all the existing problems, then defining an action plan, all these involving a long period of time.

For example, Kalpan and Norton divide the life cycle of a business in three stages: growth, maturity and decline. Three financial themes are also usually set: income growth, cost reduction / productivity increase, and resource user. In fact, instead of wishing to increase the level of the performance indicatives, a lot of companies concentrate on the risk of not fulfilling these indicatives.

Then, when it is strategically important, these organizations will want to incorporate the management risks within the financial perspective. In conclusion, it is important for all objectives and indicatives set in the other perspectives to be tied to one or more objectives of the financial perspective.

The creation of a Balanced Scorecard involves a considerable period of time for everybody whose performances are being measured.

Setting the strategy is time-consuming, but it does not use so much time as finding and defining the performance measurement indicatives for each perspective does. Usually, people hardly agree on what and how is being measured.

Moreover, a large number of people are involved in building a BSC, and these people's approval is very important both for building and implementing the instrument. It can happen that a Balanced Scorecard is well-built, but its disapproval by the employees, as well as their lack of involvement will make the model useless. There is also the risk of too many indicatives being selected. This is a problem because it is very difficult to use and interpret too many results.

Before the described perspective, we need tools to describe the intangible assets, the Balanced Scorecard by means of elaborating an strategic map, relates and transforms these intangibles assets into tangibles, as money. The Balanced Scorecard through his four perspectives, uses indicators to describe the intangible assets, therefore we can monitor and control the intangible activities which add value to the company.

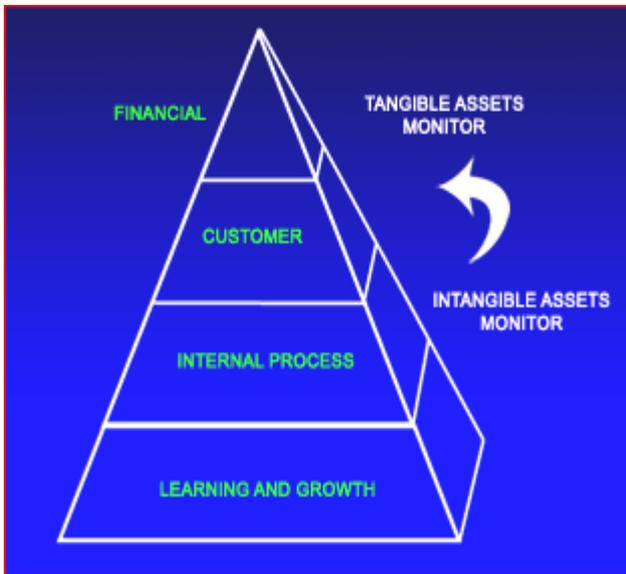


Fig. 2. The BSC strategic maps and the organizations assets [4]

The intangible assets are the most important sources of the organization that grant competitive advantages to other companies. The organization that has an excellent operative process, knows their segment in the market and possess the knowledge to develop a unique

product, and has the ability of motivating their employers, will have a guaranteed success.

The tangible assets are considered the goods of material nature they can be perceived by senses like :

- ✚ Row material and stocks
- ✚ The furniture
- ✚ The machines
- ✚ The lands
- ✚ The money

The intangible assets are considered the goods of immaterial nature:

- ✚ The science of knowing what to do
- ✚ Our relations with the clients
- ✚ Our operative processes
- ✚ The technology of information and databases.
- ✚ Capacities, abilities and innovations of the employers.

Certain indicatives can be objective, others subjective. The subjective indicatives, by definition, involve the judgment of a person, so there are chances for them to be wrong. There is always a question, namely "must the indicatives set subjectively be used"?

The Balanced Scorecard is a management system, not only a measurement one which allows the organization to set its strategy and vision and to put them into practice. The instrument offers the feedback of the business internal process and external indicatives, instead of wishing to continuously increase the strategic performances and results. After being fully developed, the Balanced Scorecard instrument transforms the strategic planning from an academic exercise into a nervous center of the organization.

In terms of Customer Satisfaction, the approach analyzes the organization's ability to provide quality goods and services and their effective delivery, while the financial perspective of the Balanced Scorecard generally represents the clear long-range targets. Now in order to lead to the success of the above two mentioned perspectives, the internal business indicator provides data regarding the internal business results against its measures. The fourth and the last major perspective concerns with learning and growth, which aims to align all of the above toward an overall organization's success.

■ **CREATION AND DESIGN OF THE BALANCED SCORECARD (BSC)**

The steps to follow the making up, the creation and the development of the Balanced Scorecard BSC must proceed from the steps presented in fig.3.

As we can see the methodology to create the Balanced Scorecard BSC, has many the first one (blue), we define the plan of the company, later we go the confection of the own Balanced Scorecard BSC (green).

If in the organizations has already an strategic plan well defined, it will not be necessary to realize the blue stage, anyway it is convenient to make an internal and strategic analysis of your company, to check our mission and vision, to know the current situation and objectives we have to reach.

Frequently, the process of creation of the Balanced Scorecard allows the executives to review the strategies and to define new ones, according to the situation where the business is developed.

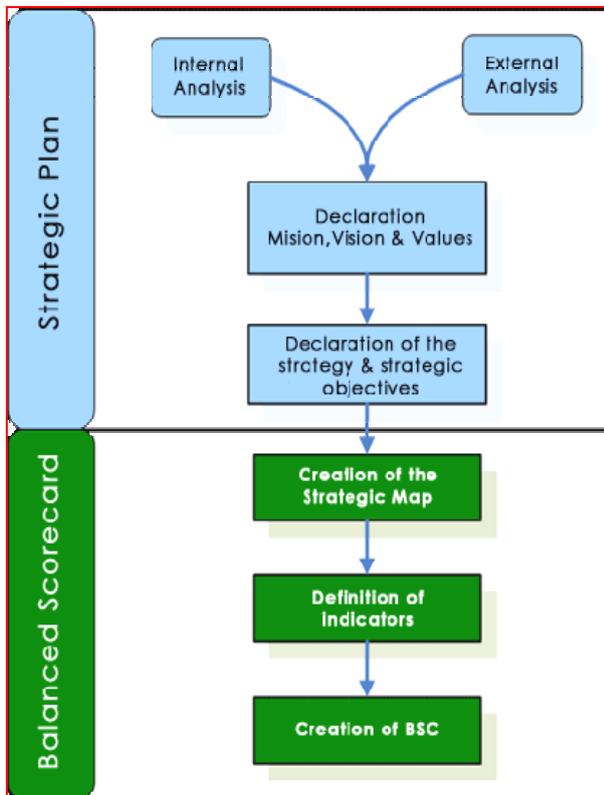


Fig. 3. Creation and the development of the Balanced Scorecard [4]

■ **CONCLUSION**

The Balanced Scorecard (BSC) is a conceptual framework enabling an organization in clarifying its vision and strategy, thus effectively translating them into action. This performance management approach provides feedback around both the internal processes and external outcomes, essentially focusing on four indicators: Customer Perspective, Internal-Business Processes, Learning and Growth and Financials.

For the present-day organizations information is no longer the basic component. Because the organizations administer a too big volume of data and information, the manner in which the relevant information is selected and used within the organizational actions and in decision-taking is of extreme importance. The ecosystem that underlies a Balanced Scorecard is made up of visions, missions, organizational values and competences, strategies.

It is important for certain fundamental observations which express the BSC's importance and value to be reiterated:

- ✚ Only 10% of the organizations that define a strategy are capable of successfully fulfilling it;
- ✚ The strategy of an organization must be clear and synthetic;
- ✚ The BSC is a strategic management and performance system;
- ✚ The BSC translates the organization's strategy into concrete actions;
- ✚ The BSC explains and clarifies an organization's strategy from both the management's and employees' point of view;
- ✚ The BSC is a communication instrument, not one of control/constraint;

The BSC allows the alignment of the component structures and organization members to the strategy set by the management team.

Implementing the balanced scorecard methodology in the projects gives quick access to important metrics - for example cost, expected return of investment (IRR) for the project, customer satisfaction, innovation etc. All these help continuously monitor the performance of the projects.

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## ***THERMO ELASTIC INSTABILITY WITHIN A CLASS IV FRICITON JOINT***

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### **■ Abstract:**

*With a class IV couple of friction joint there are conditions when the disturbances of the pressures on the interface increase, decrease or remain unchanged. When the two materials of the joint are identical a relative stability is formed regarding this phenomenon, while a good heat-conducting material coupled with a heat insulator, depending on certain characteristics of sliding speed, creates instability.*

*Materials of the same type making the joint tend to a relative stability when speaking of this phenomenon, while a joint composed of a good heat conductor material and a insulator will always show characteristics of relative sliding speed, from which instability appears.*

*Equation of this paper specifies the threshold for instability. The equations serve to provide the terms depending on which the pressure disturbance in a frontal sealing interface increases. In this case load concentrations occur in small portions of the contact surfaces, resulting in damage or separation of the rings.*

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### **■ Keywords:**

*Thermo elastic instability; Solutions; Temperature wave*

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### **■ INTRODUCTION**

*With a class IV friction joint (annular joint), which is the primary sealing of a frontal sealing, may appear situations in which pressure disturbances within the interface decrease, increase, or remain constant. These in turn are influenced by the properties of the materials in contact, coefficient of friction and relative sliding velocity.*

*The increase of the pressure disturbances in the interface leads to an increase in contact pressure and the local temperature. Adjacent to the zones with low pressure the surfaces can detach leading to important losses by leakage.*

*Materials of the same type making the joint tend to a relative stability when speaking of this phenomenon, while a joint composed of a good heat conductor material and a insulator will always show characteristics of relative sliding speed, from which instability appears.*

*The sliding contact at relatively high speeds is associated with a macroscopic instability, so that on a flat and uniform contact area will appear disturbances of local pressure.*

*This leads to negative effects upon the contact area from the point of view of heating and wear.*

*The simplified configuration of the primary sealing (class IV friction joint) is presented in Fig. 1. For such geometry, if the pressure is uniform*

in the interface, the temperature slowly rises until it hits a nominal value determined by the operating parameters.

If instead the uniform distribution of the pressure is disturbed even sparsely (which can be expressed as a Fourier series or waves along the contact surface) the disturbance may diminish, may remain unchanged or may rise. Thus, the stability of the pressure distribution can be investigated according to the behavior of waves of initial disturbance.

The problem is assumed to be ideal linear, with a linear heat transfer, thermal expansion and elastic displacement so that:

- ✚ the solution found is for the pressure wave produced at the surface of the semi-infinite ring extremity when there is a temperature wave of constant amplitude moving with constant speed;
- ✚ there is a relationship between the pressure wave and the heat produced by friction, generated at the limiting value, where it is assumed that another plate slides over and takes over the pressure distribution.

As an additional restriction of harmful waves it is assumed that there is no disruption at the extremities of the distance corresponding to the circumference of the tube (fig 1).

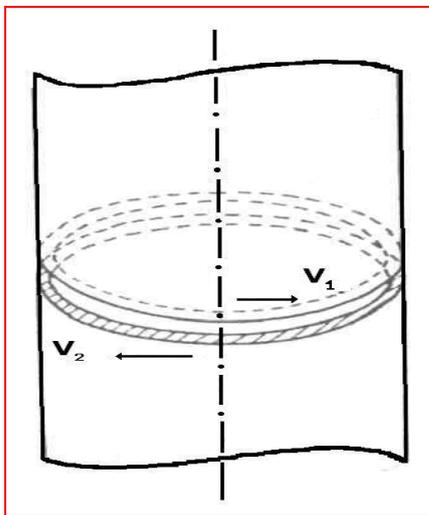


Figure 1

This implies that the harmonic components of the disturbance, complete one or more numbers of cycles over the specified length.

The combination of properties of materials in contact and operating conditions which satisfy the entire set of conditions will be considered to define the circumstances of a specified

wavelength disturbance, without diminution or amplification.

■ SOLUTIONS FOR A TEMPERATURE WAVE WITH CONSTANT MOVEMENT

If referred to one of the plates marked with 1, the edge temperature perturbation can be expressed:

$$T = T_0 \cdot \sin \omega(x-vt) \quad (1)$$

where:

- ✚  $T_0$  is the constant for temperature
- ✚  $\omega = 2n\pi/L$  the measure of wave number
- ✚  $x$  – is measured along the contact surface
- ✚  $v$  - Instantaneous transverse velocity of the wave along the contact surface

Heat transfer equation:

$$\delta^2 T / \delta x^2 + \delta^2 T / \delta y^2 - (\delta T / \delta t) / k = 0 \quad (2)$$

$$-\infty \leq x \leq \infty$$

$$0 \leq y \leq \infty$$

with  $T=0$  when  $y \rightarrow \infty$ ;  $y$  is measured perpendicular to the contact surface

Solution for body number 1:

$$T_1 = T_0 e^{-b_1 y} \sin(\omega x - \omega v_1 t + a_1 y) \quad (3)$$

where:

$$b_1 = \{ \omega^2 / 2 + \omega / 2 [ \omega^2 + (v_1 / k_1)^2 ]^{1/2} \}^{1/2} \quad (4)$$

$$a_1 = \{ -(\omega^2 / 2) + \omega / 2 [ \omega^2 + (v_1 / k_1)^2 ]^{1/2} \}^{1/2} \quad (5)$$

where:

- ✚  $k$  – material diffusion capability
- ✚  $K$  - material conductivity
- ✚  $p$  - pressure
- ✚  $c_p$  – specific heat

The heat flow ( $q_1$ ) is given by the equation:

$$q = -K(\delta T / \delta y)_{y=0} = -KT [ a_1 \cos(\omega x - \omega v_1 t) - b_1 \sin(\omega x - \omega v_1 t) ] \quad (6)$$

Surface temperature will be:

$$T = T_0 \sin \omega t \quad (7)$$

and

$$q_1 = K_1 T_0 (b_1 \sin \omega x - a_1 \cos \omega x) \quad (8)$$

For the second body (which moves in the opposite direction relatively to the temperature wave with the speed  $v_2$ ):

$$T_2 = T_0 e^{b_1 y_1} \sin(\omega x - \omega v_2 t - a_2 t) \quad (9)$$

where  $a_2$  and  $b_2$  correspond to the (4) and (5) equations with the correct changes for indices. Thus:

$$q_2 = -K_2 (\delta T_2 / \delta y_2)_{y_2 > 0} = K_2 T_0 [a_2 \cos(\omega x - \omega v_2 t) - b_2 \sin(\omega x + \omega v_2 t)] \quad (10)$$

If the wave is stationary and plate is moving relative to it:

$$q_2 = K_2 T_0 (b_2 \sin \omega x + a_2 \cos \omega x) \quad (11)$$

and

$$q = q_1 + q_2 = T_0 [(K_1 b_1 + K_2 b_2) \sin \omega x + (K_2 a_2 - K_1 a_1) \cos \omega x] \quad (12)$$

**STATE OF THERMO ELASTIC STRESS IN A PLATE SUBJECTED TO A WAVE OF TEMPERATURE THAT MOVES UNIFORMLY**

The thermo elastic equation of a plate depending on the potential of displacement  $\Psi$  is:

$$\delta^2 \Psi / \delta x^2 + \delta^2 \Psi / \delta y^2 = (1 + \nu_0) \alpha T_0 e^{b_1 y} \sin(\omega x + a_1 y - \omega v t) \quad (13)$$

where:

$\alpha$  - coefficient of thermal expansion

$\nu_0$  - Poisson's coefficient

The speed  $v$  of the surface on the direction of  $y$  is zero ( $v_{y > 0}$ ) and  $\Psi \rightarrow 0$  when  $y \rightarrow \infty$ ,  $\delta \Psi / \delta y \equiv v$ , resulting in:

$$\Psi_1 = (Ae^{\omega y})(C \cos \omega x + D \sin \omega x) + (k_1 / \nu \omega) (1 + \nu_1) \alpha_1 T_0 e^{b_1 y} \cos(\omega x + a_1 y) \quad (14)$$

Coefficients  $C$  and  $D$  are evaluated to meet the condition on the limit. Results that the surface pressure  $p_1$  will be:

$$p_1 = E_1 \alpha_1 T_0 k_1 [-(\omega - b_1) \cos \omega x + a_1 \sin \omega x] / \nu_1 \quad (15)$$

A similar equation can be written for the body numbered 2. At the moment of contact between the two bodies each surface will suffer a displacement equal and contrary till the equalization of tensions:

$$p_1 = E \omega \delta / 2$$

with  $\delta = \delta_0 \sin \omega x$  ← thermal layer thickness

As a result:

$$p = -E_1 \omega \delta / 2 = p_1' + p'' \quad (16)$$

$$p = E_2 \omega \delta / 2 = p_2' + p'' \quad (17)$$

Given the fact that  $p$  must be identical for the two bodies (according to the law of balance)  $\delta$  can be eliminated

$$p = E_1 E_2 T_0 \{ [\alpha_2 k_2 (\omega - b_2) / \nu_2 - \alpha_1 k_1 (\omega - b_1) / \nu_1] \cos \omega x + [\alpha_2 k_2 a_2 / \nu_2 + \alpha_1 k_1 a_1 / \nu_1] \sin \omega x \} / (E_1 + E_2) \quad (18)$$

According to the principles of equilibrium, the heat generated by friction must be equal to the heat from the interface if:

$$mp (\nu_1 + \nu_2) = q \quad (19)$$

$$(K_1 b_1 + K_2 b_2) \sin \omega x + (K_2 b_2 - K_1 b_1) \cos \omega x = (\nu_1 + \nu_2) \mu E_1 E_2 \{ [\alpha_2 k_2 (\omega - b_2) / \nu_2 - \alpha_1 k_1 (\omega - b_1) / \nu_1] \cos \omega x + [\alpha_2 k_2 a_2 / \nu_2 + \alpha_1 k_1 a_1 / \nu_1] \sin \omega x \} / (E_1 + E_2) \quad (20)$$

To satisfy the equation (20):

$$K_1 b_1 + K_2 b_2 = (\nu_1 + \nu_2) \mu E_1 E_2 [\alpha_2 k_2 a_2 / \nu_2 + \alpha_1 k_1 a_1 / \nu_1] / (E_1 + E_2) \quad (21)$$

$$K_2 b_2 - K_1 b_1 = (\nu_1 + \nu_2) \mu E_1 E_2 [\alpha_2 k_2 a_2 (\omega - b_2) / \nu_2 - \alpha_1 k_1 a_1 (\omega - b_1) / \nu_1] / (E_1 + E_2) \quad (22)$$

So for bodies of the same material:  $\nu_1 = \nu_2 = \nu / 2$ , and equation (21) reduces to:

$$\mu E \alpha k a / b K = 1 = \mu E \alpha k a \{ [1 + [1 + (\nu / k \omega)^2]^{1/2}] / [1 + [1 + (\nu / k \omega)^2]^{1/2}] \}^{1/2} / K \quad (23)$$

and for two bodies of which, one is good conduit for heat and other heat isolated:

$$k_1 \rightarrow 0, K \rightarrow 0, \nu_2 \rightarrow 0, \text{ and } \nu_1 \rightarrow \nu. \text{ If } \nu > 1, a_1 \rightarrow \omega (\nu / 2 k_1 \omega)^{1/2}$$

$$a_2 \rightarrow \nu_2 2 k_2; b_1 \rightarrow \omega (\nu / 2 k_1 \omega)^{1/2}; b_2 \rightarrow \omega [1 + (c_2 / k_2 \omega)^2 / \delta]$$

and equation (21) reduces to:

$$\nu_1 = \nu = 2 K_2 \omega (E_1 + E_2) / \mu E_1 E_2 \alpha_2 \quad (24)$$

**CONCLUSION**

The equations from above serve to provide the terms depending on which the pressure disturbance in a frontal sealing interface increases. In this case load concentrations occur

*in small portions of the contact surfaces, resulting in damage or separation of the rings. For materials of the same type, instability occurs only at a high coefficient of friction. Initial size of the uniform load has little influence on the general temperature which may alter the properties of the materials. Role of slip velocity is also small.*

*In case the material has different properties from the point of view of transfer of heat produced by friction will be taken from the heat-conducting body and the limit between stability and instability depends on the relative sliding velocity.*

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<sup>2.</sup> MIHAELA JULA,

<sup>3.</sup> IOAN LAZA

<sup>1. 2. 3</sup> FACULTY OF MECHANICAL ENGINEERING,  
UNIVERSITY "POLITEHNICA" TIMISOARA, ROMANIA

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**GENERAL GUIDELINES  
FOR PREPARATION OF MANUSCRIPTS  
FOR REVIEW IN  
ACTA TECHNICA CORVINIENSIS  
– BULLETIN OF ENGINEERING**

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■ **Abstract:**

*a maximum 100 words abstract will be written, simple spaced, in **ENGLISH***

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■ **Keywords:**

*a maximum 10 representative words for the paper*

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■ **THE TEXT**

*The submitted manuscript must be content **INTRODUCTIVE NOTES (INTRODUCTIONS)**, follow by the **METHODOLOGY**, the **PRELIMINARY RESULTS** or the **FINAL RESULTS**, and, in final, the **CONCLUSIONS** about the presented notes.*

*Also, the paper included the **ABSTRACT**, **KEYWORDS**, and **REFERENCES**.*

*The conclusions must be clear, relevant and must be indicate some the empirical, theoretical, methodological or scientific aspects of the research, and the author's contributions, or the future preliminaries of our research. It will publish empirical, theoretical and methodological articles.*

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■ **THE TABLES, FIGURES, GRAPHS AND EQUATIONS**

*Tables and Figures should be numbered, titled and the resource should be mentioned below them. Photographs in the text are preferable to be in black and white, but must be clear, with a high contrast. Under each figure there will be typed, centered, "Figure X. Name of the figure".*

*Tables will be part of the text, designed as "Table y. Name of the table", written above the table, centered.*

*The equations will be inserted in the text – left aligned – and will be numbered with Arabian figures, in round brackets, right aligned. Before and after the equation a blank line will be left.*

---

■ **SUBMISSION OF MANUSCRIPTS**

*The original of the technical paper will be sent through e-mail as attaché document (\*.doc, Windows 95 or higher).*

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■ **ACKNOWLEDGMENT**

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*If is necessary, please write yours works based research [Title, Contract no., Team, Year etc]*

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■ **REFERENCES**

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[1] *AUTHORS. YEAR. TITLE OF REFERENCE, JOURNALS NAME, VOLUME, PAGES*

[2] *AUTHORS. YEAR. TITLE OF BOOK, EDITING HOUSE*

[3] *AUTHORS. YEAR. TITLE OF REFERENCE, CONFERENCE NAME, VOLUME OR PROCEEDING, PAGES*

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■ **AUTHORS & AFFILIATION**

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<sup>1</sup> *NAME SURNAME*

<sup>2</sup> *NAME SURNAME*

<sup>1</sup> *DEPARTMENT, FACULTY, UNIVERSITY, COUNTRY*

<sup>2</sup> *INSTITUTION OR COMPANY, COUNTRY*



**ACTA TECHNICA CORVINIENSIS**  
**– BULLETIN of ENGINEERING**

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ROMANIA

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**INTERNATIONAL SYMPOSIUM  
“INTERDISCIPLINARY REGIONAL RESEARCH”  
– ISIRR 2009 –**

**ISIRR  
2009**

**ROMANIA - HUNGARY - SERBIA**



**HUNEDOARA, ROMANIA,  
23 - 24 APRIL, 2009**

■ **FIRST ANNOUNCEMENT**

*It is our great privilege and pleasure to extend a cordial and sincerely invitation to you and your colleagues to attend the 10<sup>th</sup> INTERNATIONAL SYMPOSIUM “INTERDISCIPLINARY REGIONAL RESEARCH” – ISIRR 2009 – JUBILEE EDITION, which will be held in Hunedoara – Romania, in April, 23<sup>rd</sup> – 24<sup>th</sup>, 2009.*

*The 10<sup>th</sup> INTERNATIONAL SYMPOSIUM “INTERDISCIPLINARY REGIONAL RESEARCH” – ISIRR 2009 – JUBILEE EDITION, will ensure an exchange of scientific information and didactical opinions in fields with an impressive dynamic considering the research and the technological progress.*

*The Symposium will also provide the opportunity for exchanging ideas and experience with our colleagues coming from **HUNGARY, SERBIA** and **ROMANIA** and for developing new scientific collaboration.*

■ **KEYWORDS:**

*Scientific events, Multidisciplinary, Symposium, Scientific collaborations*

**GENERAL INFORMATION**

- ✚ *Data: THURSDAY, 23<sup>rd</sup> – FRIDAY, 24<sup>th</sup> of APRIL, 2009.*
- ✚ *The official language at the SYMPOSIUM is ENGLISH, and the papers will be accepted only in ENGLISH.*
- ✚ *The Symposium includes PLENARY SESSIONS, WORK-SHOPS, POSTER PRESENTATIONS, INFORMATIVE and AGREEMENT ACTIONS.*
- ✚ *The papers of a high scientific level will be presented during the SYMPOSIUM, while the rest of the papers will have a poster-form presentation.*
- ✚ *The papers, classified according to the topics and presented in the SYMPOSIUM sections, will be collected in the CD VOLUME PROCEEDINGS.*
- ✚ *Also, the selected papers will be appear in a special number of the multidisciplinary engineering journal ANNALS OF FACULTY OF ENGINEERING HUNEDOARA – JOURNAL OF ENGINEERING (FASCICULE 4/2009, PRINT VERSION, ISSN 1584-2665).*
- ✚ *A selected lot of papers from the SYMPOSIUM sections will be collected in the ONLINE SUPPLEMENT of ANNALS OF FACULTY OF ENGINEERING HUNEDOARA – JOURNAL OF ENGINEERING, in the ACTA TECHNICA CORVINIENSIS – BULLETIN OF ENGINEERING.*
- ✚ *The papers will have to frame into topics, to have an interdisciplinary character, and to be at the level of an international symposium.*
- ✚ *The selected papers will have to be presented in the SYMPOSIUM sections therefore the presence of one of the authors is required.*
- ✚ *It is preferable for the papers to have an interdisciplinary characteristic and to treat themes of mutual interest for our geographical area: eastern HUNGARY, northern SERBIA and western ROMANIA.*
- ✚ *Priority is given to papers produced by a mixed team of researchers from the three countries.*
- ✚ *Researchers from other countries may participate as well, on the condition of applicability for their results on the above mentioned geographical areas.*

**ORGANIZERS**

The 10<sup>th</sup> INTERNATIONAL SYMPOSIUM "INTERDISCIPLINARY REGIONAL RESEARCH" – ISIRR 2009 organizers are:

- FACULTY OF ENGINEERING HUNEDOARA,
  - UNIVERSITY POLITEHNICA TIMISOARA
  - ASSOCIATION FOR MULTIDISCIPLINARY RESEARCH OF THE WEST ZONE OF ROMANIA (ACM-V) – TIMISOARA
  - GENERAL ASSOCIATION OF ROMANIAN ENGINEERS (AGIR) – branch of HUNEDOARA
  - ROMANIAN NATIONAL PARK "RETEZAT"
- with kindly support of our partners:
- HUNGARIAN ACADEMY OF SCIENCE – branch of SZEGED, HUNGARY
- and
- UNIVERSITY OF NOVI SAD, NOVI SAD, SERBIA

**INTERNATIONAL SCIENTIFIC COMMITTEE**

- Prof. dr. NICOLAE FARBAŞ – head of ASSOCIATION FOR MULTIDISCIPLINARY RESEARCH OF THE WEST ZONE OF ROMANIA (ACM-V) – TIMIȘOARA, ROMANIA
- Prof. h.c. dr. eng. GALLIA BUTNARU – „BANAT” UNIVERSITY OF AGRICULTURAL SCIENCES AND VETERINARY MEDICINE TIMISOARA, ROMANIA
- Prof. dr. eng. TEODOR HEPUT – dean of the FACULTY OF ENGINEERING – HUNEDOARA, ROMANIA
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- Prof. dr. MARIA HOMOKI-NAGY – scientific secretary of HUNGARIAN REGIONAL ACADEMY OF SCIENCES, SZEGED, HUNGARY
- Prof. dr. CECILIA HODUR – member of HUNGARIAN REGIONAL ACADEMY OF SCIENCES, SZEGED, HUNGARY
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- Prof. dr. VLADIMIR KATIC – UNIVERSITY OF NOVI SAD, FACULTY OF ENGINEERING, NOVI SAD, SERBIA
- Prof. dr. eng. FRANCISC WEBER – head of the GENERAL ASSOCIATION OF THE ROMANIAN

ENGINEERS (AGIR) – branch of HUNEDOARA, ROMANIA

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- Assoc. Prof. dr. eng. CAIUS PĂNOIU – vice-dean of FACULTY OF ENGINEERING – HUNEDOARA, ROMANIA
- Prof. dr. STEFAN MAKSAY – FACULTY OF ENGINEERING – HUNEDOARA, ROMANIA
- Prof. dr. ing. ȘTEFAN BARTZER – University Politehnica Timișoara, ROMANIA
- Prof. dr. DORIN BRATU – „VICTOR BABEȘ” UNIVERSITY OF MEDICINE AND FARMACY, TIMIȘOARA, ROMANIA
- Prof. dr. ing. MARIAN BURA – „BANAT” UNIVERSITY OF AGRICULTURAL SCIENCES AND VETERINARY MEDICINE TIMISOARA, ROMANIA

#### ■ REGIONAL ORGANIZING COMMITTEE

Assoc. Prof. dr. eng. IMRE KISS  
– scientific secretary of the SYMPOSIUM

Assoc. Prof. dr. eng. ANA VIRGINIA SOCALICI  
– scientific secretary of the FACULTY OF ENGINEERING – HUNEDOARA

Assist. Prof. ec. dr. eng. VASILE ALEXA  
– co-coordinator of organizing activities

Assist. Prof. dr. eng. SORIN RATIU  
– co-coordinator of organizing activities

Assist. Prof. dr. eng. VASILE GEORGE CIOATĂ  
– co-coordinator of organizing activities

#### ■ SYMPOSIUM TOPICS

##### ▪ SECTION 1.

**ECONOMICAL DEVELOPMENT AND STRATEGIES IN OUR REGIONS AND ABROAD**, focusing on problems concerning the general field of economics and management, the European Integration of our countries, the differences between the development of the regions from Eastern Europe and the management of diminishing unfavorable differences, including aspects regarding the globalization and economy of small and medium enterprises, human resources, management strategies and organization behavior, provides a leading forum for interaction and research on the competitive

strategies of managers and the organizational structure of firms;

##### ▪ SECTION 2.

**MEDICAL ISSUES, LABOR HEALTH AND VETERINARY MEDICINE**, focusing on novelties in medical studies and veterinary medicine, medical advice, diagnoses and treatment, including new knowledge on pathogens, immunity to pathogenic micro-organisms, epidemiology related to infections, specific aspects of treatment of diseases, pathological and clinical studies (including case reports), diagnosis tests and technical reports, as well as labor related accidents and professional diseases

##### ▪ SECTION 3.

**APPLIED ECOLOGY AND ENVIRONMENTAL PROTECTION IN THE REGION**, focusing on the management of the city and on industrial waste materials, debating issues concerning the environmental engineering, the environmental impact analysis and assessment, the industrial and urban environmental management, the cleaning process, pollution agents and pollution sources, water – air – soil quality analysis, the re-utilization of industrial wastes and the diminishing of pollution and the environmental planning and environmental protection in the regions of the Eastern Europe area;

##### ▪ SECTION 4.

**USES OF NATURAL RESOURCES IN REGIONS, MINING, ENERGY CONSERVATION AND PLANNING**, focusing on general fields of industry, mining, agriculture, forestry, botany and horticulture, hydrology, biotechnology, material and energetically resources, including energy conservation and planning and alternate energy development, in multidisciplinary studies;

##### ▪ SECTION 5.

**APPLIED SCIENCES AND TECHNOLOGIES – MANUFACTURING AND RESEARCH IN ENGINEERING FIELDS**, focusing on engineering science and practice, covering the full spectrum of engineering theory and practice, including studies involving the application of physical and mathematical techniques to fundamental investigations and emerging areas within the engineering fields, incoming with information from a wide variety of applied science specialties in multidisciplinary studies;

▪ **SUBSECTION 5.A**

**APPLIED SCIENCES AND TECHNOLOGIES – MANUFACTURING AND RESEARCH IN MECHANICAL ENGINEERING**, focusing on mechanical engineering science and practice, covering the full spectrum of mechanical field.

▪ **SUBSECTION 5.A**

**APPLIED SCIENCES AND TECHNOLOGIES – MANUFACTURING AND RESEARCH IN INFORMATICS & ELECTRICAL ENGINEERING**, focusing on electrical engineering and informatics, covering the full spectrum of electrical field.

▪ **SUBSECTION 5.A**

**APPLIED SCIENCES AND TECHNOLOGIES – MANUFACTURING AND RESEARCH IN MATERIAL SCIENCE ENGINEERING**, focusing on material science and engineering, theory and practice, covering the full spectrum of metallurgy fields, including raw materials and waste management in this industry.

▪ **SECTION 6.**

**METHODS AND TECHNIQUES, INSTRUMENTS AND SUPPLIES IN THE NATURAL SCIENCE FIELDS**, focusing on the theory and practice of chemistry and physics, covering the full spectrum of natural sciences in multidisciplinary studies;

▪ **SUBSECTION 6.A**

**METHODS AND TECHNIQUES, INSTRUMENTS AND SUPPLIES IN THE FIELDS OF CHEMISTRY AND PHYSICS**, focusing on the general chemistry and physics, including the multidisciplinary in these areas.

▪ **SUBSECTION 6.A**

**METHODS AND TECHNIQUES, INSTRUMENTS AND SUPPLIES IN THE FIELD OF MATHEMATICS**, focusing on the mathematic fields and the application of mathematics in the engineering.

▪ **INFORMATIVE MEETING,**

discussing the topic: **REGIONAL INTEGRATION**, concerning the expanding of the application area for the transferable credit system between the specialized faculties and universities from HUNGARY, SERBIA and ROMANIA, educational and pedagogical issues common for this countries, as well as problems regarding the extending of connections between the institutions on educational matters, teaching and specializing

processes and co-operation between professors and students.

The SYMPOSIUM is an open invitation for all specialists, professors, researchers and experts in all scientific fields, who can produce a free presentation of the results in their activities. It is preferable for the papers to have an interdisciplinary characteristic and to treat themes of mutual interest for our geographical area: eastern HUNGARY, northern SERBIA and western ROMANIA.

Priority is given to papers produced by a mixed team of researchers from the three countries. Researchers from other countries may participate as well, on the condition of applicability for their results on the above mentioned geographical areas.

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■ **DEADLINES**

✚ For the paper selection, you are kindly invited to submit a maximum 200 words abstract and post it to the address of the SYMPOSIUM by 15 FEBRUARY 2009, stating the section in which the papers will be presented.

✚ Notification of acceptance, instructions for preparing camera-ready manuscripts, financial and other details will be sent by 15 MARCH 2009.

✚ The camera-ready manuscript must be sent to the ISIRR 2009 – SECRETARY OFFICE by 30 MARCH 2009.

✚ The final announcement of confirmation for publishing and the day of presentation will be sent by 10 APRIL 2009.

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■ **INVITATION**

The SYMPOSIUM is an open invitation for all specialists, professors, researchers and experts in all scientific fields, who can produce a free presentation of the results in their activities.

For more information please contact the FACULTY OF ENGINEERING – HUNEDOARA, SECRETARY OFFICE OF THE ORGANIZING COMMITTEE.

An e-mail address was be opened to receive your correspondence: [redactie@fih.upt.ro](mailto:redactie@fih.upt.ro)

All information on the conference will also be available on the web at <http://annals.fih.upt.ro/sustained-events>.

■ **SCHEDULE OF EVENTS**

**1<sup>ST</sup> DAY, THURSDAY, 23<sup>RD</sup> APRIL, 2009**

- 08.00 – Welcoming of guests and registration of participants – in the HALL of FACULTY OF ENGINEERING – HUNEDOARA
- 10.00 – Opening Ceremony – in the AMPHITHEATRE of FACULTY OF ENGINEERING – HUNEDOARA

*Plenary Lecture # 1*

FROM THE RETEZAT NATIONAL PARK TO EUROPE'S "YELLOWSTONE" - SEEDS FOR THOUGHTS FOR THE ESTABLISHMENT AND EFFICIENT MANAGEMENT OF EUROPE'S LARGEST PROTECTED AREA COVERING THE SOUTHERN AND WESTERN CARPATHIANS IN ROMANIA AND SERBIA

Dr. ERIKA STANCIU – WWF DANUBE CARPATHIAN PROGRAMME, CARPATHIAN, FORESTS AND PROTECTED AREA LEADER, RETEZAT NATIONAL PARK PRESIDENT

*Plenary Lecture # 2*

SUSTAINABLE DEVELOPMENT AND THE ECONOMIC CRISIS

Dr. CARMEN HĂRĂU – UNIVERSITY POLITEHNICA TIMIȘOARA, FACULTY OF ENGINEERING – HUNEDOARA

*Plenary Lecture # 3*

SLAG – UTILIZATION IN ROAD CONSTRUCTION – EXPERIENCE AND SOLUTIONS

Eng. RODICA ISTRATE – BUSINESS SERVICES PREST SRL HUNEDOARA

*Plenary Lecture # 4*

ADVANCED TECHNIQUES IN ELECTRON SPECTROSCOPY FOR SURFACE AND INTERFACE STUDIES,

Prof. Dr. BERNARD GRUZZA – POLYTECH'CLERMONT-FERRAND UFR SCIENCES, UNIVERSITÉ BLAISE PASCAL – CLERMONT II CLERMONT-FERRAND, HEAD OF THE RESEARCH GROUP "SURFACES AND INTERFACES", LABORATOIRE DES SCIENCES DES MATÉRIAUX POUR L'ELECTRONIQUE ET D'AUTOMATIQUE, LASMEA, FRANCE

- 11.30 – Coffee break – in the HALLS of FACULTY OF ENGINEERING – HUNEDOARA

- 12.00 – Setting of posters by sections – in the HALLS of the FACULTY OF ENGINEERING

- 12.30 – Presentations and debates by sections – in the AMPHITHEATRES of the FACULTY OF ENGINEERING

- 14.00 – Break for lunch – in the STUDENT RESTAURANT of the Faculty of Engineering – Hunedoara

- 16.00 – Debates by sections – in the Amphitheatres of FACULTY OF ENGINEERING

- 19.00 Festive dinner – in the HOTEL MAIER – HUNEDOARA \*\*\*

**2<sup>ND</sup> DAY, FRIDAY, 24<sup>TH</sup> APRIL, 2009**

- 08.00 – Breakfast – in the HOTEL MAIER – HUNEDOARA \*\*\* and in the STUDENT RESTAURANT of the FACULTY OF ENGINEERING – HUNEDOARA

- 10.00 – Presentations and debates by sections and posters – in Halls and in Amphitheatres of the FACULTY

- 11.30 – Informative Meeting – in the COUNCIL CHAMBER of the FACULTY OF ENGINEERING

- 12.30 – Final debates and CLOSING CEREMONY – in the Amphitheatre of FACULTY OF ENGINEERING

- 13.30 – Break for lunch – in the STUDENT RESTAURANT of the FACULTY OF ENGINEERING – HUNEDOARA

- 14.00 Visit to tourist sights (CORVIN CASTLE and surroundings)

■ **PROGRAM SCHEDULE**

Faculty of Engineering – Hunedoara

Amphitheatre # 1 – # 6

Group C, Floor 1

Group B, Floor 2

Group F, Floor 1

Presentations and debates by sections

**1<sup>ST</sup> DAY, THURSDAY, 23<sup>RD</sup> APRIL, 2009**

12.30 – 14.00 and 16.00 – 19.00

Faculty of Engineering – Hunedoara

Central Hall # 1 – Group C, Floor 1

Presentations and debates by posters

**1<sup>ST</sup> DAY, THURSDAY, 23<sup>RD</sup> APRIL, 2009**

16.00 – 19.00

**2<sup>ND</sup> DAY, FRIDAY, 24<sup>TH</sup> APRIL, 2009**

10.00 – 12.00

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■ **THE INFORMATIVE MEETING**

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- discussing the topics:

- ✚ REGIONAL INTEGRATION, concerning the expanding of the application area for the transferable credit system between the specialized faculties and universities from HUNGARY, SERBIA and ROMANIA, educational and pedagogical issues common for this countries, as well as problems regarding the extending of connections between the institutions on educational matters, teaching and specializing processes and co-operation between professors and students.
- ✚ EXTEND AREA OF ISIRR, discussing about the expanding possibilities of the ISIRR in BULGARIA and SLOVAKIA.
- ✚ ISIRR for ISI PROCEEDINGS APPLICATION, discussing about the possibilities to accede into international databases for recognize the ISIRR as important Symposium in this area.
- ✚ THE 11<sup>th</sup> ISIRR, organized in SZEGED, HUNGARY, in preliminary discussions

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■ **SECRETARY OFFICE  
OF THE ORGANIZING COMMITTEE**

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**3<sup>RD</sup> INTERNATIONAL SYMPOSIUM  
ON TRACE ELEMENTS IN THE FOOD CHAIN –  
DEFICIENCY OR EXCESS OF TRACE ELEMENTS  
IN THE ENVIRONMENT AS A RISK OF HEALTH  
- TEFC 2009  
BUDAPEST, HUNGARY  
21-23 May 2009**

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■ **INVITATION**

You are cordially invited to attend the

**3<sup>RD</sup> INTERNATIONAL SYMPOSIUM ON TRACE ELEMENTS IN THE FOOD CHAIN –  
DEFICIENCY OR EXCESS OF TRACE ELEMENTS IN THE ENVIRONMENT AS A RISK OF  
HEALTH (TEFC – 2009)**

to be organized by the Working Committee on Trace Elements of the Hungarian Academy of Sciences (HAS), as well as the Institute of Materials and Environmental Chemistry of the HAS, in

**BUDAPEST, HUNGARY**

**21-23 May 2009.**

*The purpose of the Symposium is to congregate experts interested in the investigation of trace elements of the food chain, involving analytical, metabolic, toxicological aspects, focussing on the environmental and health concerns.*

*Accordingly, following our traditions we intend to provide a multidisciplinary forum for exchange of experiences and expertise.*

*Special attention will be given to the deficiency or excess in the environment as a risk of health, the speciation and transfer of trace elements in the food chain, to the factors influencing these processes.*

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■ **GENERAL SUBJECT AREAS, TOPICS**

Scientific sessions are expected to cover the following general subject areas:

- ✚ *METHODICAL ASPECTS OF TRACE ELEMENT RESEARCH. SPECIATION.*
- ✚ *NANOTECHNOLOGY FOR TRACE ELEMENT RESEARCH.*
- ✚ *ENVIRONMENTAL ASPECTS OF TRACE ELEMENTS CONCERNING AIR, WATER, SOIL, MICROORGANISMS AND PLANTS.*
- ✚ *TRACE ELEMENT STATUS AND RISK OF HEALTH IN PLANTS, ANIMALS AND MAN.*

- ✚ *FOOD AND FEED SAFETY IN HUMAN AND ANIMAL NUTRITION.*

■ **OTHER TOPICS**

- ✚ *POSSIBILITIES AND DIFFICULTIES IN THE ANALYSIS OF TRACE ELEMENTS.*
- ✚ *TRACE ELEMENTS AS AIR POLLUTANTS.*
- ✚ *SEWAGE SLUDGES AS TRACE ELEMENT SOURCES.*
- ✚ *BIOAVAILABILITY AND MOBILITY OF TRACE ELEMENTS IN SOILS.*
- ✚ *REMEDIATION OF TRACE ELEMENT CONTAMINATED SOILS.*

- ✚ BIOACCUMULATION AND TRANSLOCATION OF TRACE ELEMENTS IN PLANTS.
- ✚ TRACE ELEMENTS IN MEDICINAL PLANTS.
- ✚ TRACE ELEMENT DEFICIENCY: GENETIC AND/OR DIETARY BACKGROUND.
- ✚ BIOLOGICAL AND TOXICOLOGICAL IMPORTANCE OF TRACE ELEMENTS.
- ✚ TARGETS OF HEAVY METAL TOXICITY.
- ✚ NEUROTOXIC EFFECTS OF TRACE ELEMENT DEFICIENCY OR EXCESS.
- ✚ MICRONUTRIENTS AND CARDIOVASCULAR DISEASES.
- ✚ DEFICIENCY – EXCESS – METABOLIC DISORDERS.
- ✚ DEFICIENCY – EXCESS – ANTIOXIDANT STATUS.
- ✚ HOW MANY IS INSUFFICIENT, OPTIMAL, EXCESS?
- ✚ TRACE ELEMENTS AND OXIDATIVE STRESS.
- ✚ TRACE ELEMENTS AS ENVIRONMENTAL POLLUTANTS.
- ✚ TRACE ELEMENT SUPPLEMENTATION AND FOOD SAFETY IN PUBLIC ADMINISTRATION

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■ **SCIENTIFIC COMMITTEE**

---

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 NECHIFOR M. (ROMANIA)  
 SKESTERS A. (LATVIA)  
 THEOPHANIDES T. (GREECE)  
 TLUSTOS P. (CZECH)

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■ **NATIONAL SCIENTIFIC ADVISORY BOARD**

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■ **ORGANISING COMMITTEE**

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 FÉBEL H. (HERCEGHALOM)  
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 MÉZES M. (GÖDÖLLŐ)  
 MOLNÁR J. (BUDAPEST)  
 PAPP A. (SZEGED)  
 SIMON L. (NYÍREGYHÁZA)

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■ **DEADLINES**

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Abstract submission: JANUARY 15, 2009.  
 Information on paper acceptance: FEBRUARY 1, 2009  
 Early registration: FEBRUARY 28, 2009  
 Contribution submission: FEBRUARY 28, 2009.  
 Further information:  
<http://www.chemres.hu/tefc2009>

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■ **SECRETARY OFFICE  
 OF THE ORGANIZING COMMITTEE**

---

Dr. KLÁRA SZENTMIHÁLYI, PhD.  
[szklari@chemres.hu](mailto:szklari@chemres.hu)

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■ **SYMPOSIUM SECRETARIAT**

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e-mail: [tefc2009@chemres.hu](mailto:tefc2009@chemres.hu)  
 On behalf of the Organising Committee we look forward to meeting you in the more than eleven hundred year old HUNGARY.  
 Prof. Dr. MIHÁLY SZILÁGYI, PhD, DSc. Chair  
 Dr. KLÁRA SZENTMIHÁLYI, PhD. Secretary

## INTERNATIONAL CONFERENCE ON ENERGY EFFICIENCY AND AGRICULTURAL ENGINEERING



OCTOBER 1-3, 2009  
ROUSSE, BULGARIA

### ORGANIZED BY:

BULGARIAN NATIONAL SOCIETY OF AGRICULTURAL ENGINEERS - "Engineering and Research for Agriculture"

with the support of

- INTERNATIONAL COMMISSION OF AGRICULTURAL ENGINEERING – CIGR
- EurAgEng (SPECIAL INTEREST GROUP 23)
- ASSOCIATION OF AGRICULTURAL ENGINEERING IN SOUTHEASTERN EUROPE UNION OF SCIENTISTS - ROUSSE
- FEDERATION OF THE SCIENTIFIC TECHNICAL UNIONS- ROUSSE
- ANGEL KANCHEV UNIVERSITY OF ROUSSE

### INVITATION:

On behalf of the Organizing Committee, we would like to invite you to attend the Energy Efficiency and Agricultural Engineering Conference, organized by the Bulgarian national society of agricultural engineers (ERA) in co-operation with the 4<sup>th</sup> section of CIGR, EurAgEng (Special Interest Group 23), Union of Scientists, Association of Agricultural Engineering in South-Eastern Europe (AESEE), Federation of the Scientific Technical

Unions, Angel Kanchev University of Rousse. We are looking forward to meet you in Rousse.

### CONFERENCE GOALS:

The main objectives of the Conference are to promote exchange of research results, scientific ideas and their practical implementation concerning Energy Efficiency and Education in Agriculture and to assist personal contacts between scientists and specialists, especially from South-Eastern Europe and the developing countries. Students and young scientists will be encouraged to participate in the Conference.

### CONFERENCE TOPICS:

- AGRICULTURAL WASTE MANAGEMENT
- COMPUTER TECHNOLOGIES IN AGRICULTURE
- ELECTRONICS IN AGRICULTURE
- ENERGY AND ENVIRONMENT IN AGRICULTURE
- FOOD ENGINEERING AND BIOTECHNOLOGY
- HIGHER EDUCATION AND TRAINING
- INFORMATION SYSTEMS AND PRECISION FARMING
- LAND, WATER AND AGRO-PROCESSING ENGINEERING

- ✚ *MANAGEMENT AND ERGONOMICS*
- ✚ *PLANT AND ANIMAL PRODUCTION ENGINEERING*
- ✚ *POWER AND MACHINERY*
- ✚ *RENEWABLE ENERGY SOURCES*
- ✚ *OTHER ALLIED TOPICS*

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■ **IMPORTANT DATES:**

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FULL PAPER SUBMISSION: AUGUST 31<sup>ST</sup> 2009

FEE PAYMENT: AUGUST 31<sup>ST</sup> 2009

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■ **ORGANIZING COMMITTEE:**

---

□ **PRESIDENT:**

NICOLAY MIHAILOV

□ **MEMBERS:**

ANDONOV K.

BORISOV B.

KANGALOV P.

SMRIKAROV A.

STANCHEV D.

STOYANOV V.

TZONEV R.

VEZIROV C.

VICHEV N.

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■ **TECHNICAL CONFERENCE CHAIR:**

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□ **ASSOC. PROF. NICOLAY MIHAILOV, PRESIDENT OF ORGANIZING COMMITTEE**

□ **ASSOC. PROF. HRISTO BELOEV, RECTOR OF ANGEL KANCHEV UNIVERSITY OF ROUSSE**

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■ **INTERNATIONAL SCIENTIFIC COMMITTEE:**

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BEKE J., HUNGARY

DE WRACHIEN D., ITALY

DIPROSE M., UK

DJEVIC M., SERBIA

GEMTOS T., GREECE

KOSUTIC S., CROATIA

MARTINOV M., SERBIA

NEDEFF V., ROMANIA

PAPADAKIS G., GREECE

PEREIRA L., PORTUGAL

POPESCU S., ROMANIA

ROSE P., UK

SCHULZE L., GERMANY

SINDIR K., TURKEY

SKALIC S., BOSNIA AND HERZEGOVINA

VAIDELIENE A., LITHUANIA

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■ **INSTRUCTION TO AUTHOR:**

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The title of the paper should be in Arial 14, Bold, centered, followed by the authors' names in Arial 12, centered, .spacing before - 1 line.

The abstract, no longer than 200 words, should be Arial 10, Italic, followed by 5-6 keywords on a new line.

The paper should include Introduction, Presentation (1 or more parts), Conclusions, References, About the authors. The part titles should be Arial 12, Bold, spacing before - 0.8 line, left aligned and the content – Arial 12, First line - 1.25 cm, Single spacing, justified. The figures should be Centered and with the title under them set to Arial 12. Tables should have Right aligned description above them. Formulas should be numbered with the index right of them at 15 cm. The references should be numbered in square brackets and in Arial 12 and no other formatting.

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■ **LOCATION:**

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The Conference venue will be at Angel Kanchev University of Rousse, 330 kilometers North East from the Bulgarian capital Sofia, and 70 kilometers South from the Romanian capital Bucharest. The transport between Rousse and Sofia is regular and fast (approx. 3.5 h by bus). Timetables can be found at the Conference Secretariat.

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■ **SECRETARIAT:**

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**CONFERENCE SECRETARIAT OF ERA**

8, Studentska street

Angel Kanchev University of Rousse

7017 Rousse, Bulgaria

E-mail: [vivanova@ru.acad.bg](mailto:vivanova@ru.acad.bg)

Phone: +359 82 888 650,

Fax: +359 82 888 650.

**CONFERENCE WEB SITE:**

<http://www.ru.acad.bg/baer/EE&AE-2009/conference.htm>

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**1<sup>st</sup> CONVEEESH**  
**INTERNATIONAL CONFERENCE ON ENGINEERING,  
ENVIRONMENT, ECONOMIC, SAFETY & HEALTH**  
**&**  
**10<sup>th</sup> SENVAR**  
**INTERNATIONAL SEMINAR ON  
ENVIRONMENT & ARCHITECTURE**  
**SCIENCE & ENGINEERING FOR BETTER LIFE**  
**26 – 27 OCTOBER 2009**  
**MANADO, INDONESIA**

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■ **ORGANIZED BY:**

*Faculty of Engineering, Universitas Sam Ratulangi, Manado in Indonesia at the celebration of 45<sup>th</sup> Anniversary of Establishing the Faculty of Engineering*

■ **AIMS:**

*Sustainable development is one the key issues for modern society and requiring new ideas to advance the technologies and strategies currently in use. The main fields, which are the focus of many research efforts, are engineering, ecosystems, planning sustainability and many others. These and others aspects are the focus of the presentation and discussions that will be carrying out at the Conference.*

*The way in which our society exists, operates and develops is strongly influenced by the way in which sustainable development is applied and implemented. No function in sustainable development can be created without sufficient knowledge, and without sustainable development there can be no innovation on which the*

*existence of modern society depends. However, this international Conference will focus on topics related to Sustainable Development in Engineering, Ecology, Ecosystems, Economics and Planning.*

■ **CONFERENCE TOPICS:**

**ARCHITECTURE**

- Indoor Comfort (Thermal, Light, Sound)*
- Green Building/ Green Architecture*
- Traditional & Vernacular Architecture*
- Energy Efficient Architecture*
- Waterfront Architecture/ Coastal Architecture*
- Healthy & Convenience Living Space*
- Smart Building*
- Bioclimatic Architecture*
- Role of Architectural Education in Sustainable Development*

**TOWN PLANNING, HOUSING & REGION DEVELOPMENT**

- Ecological Coastal Planning*
- Disaster Management*

- *Energy Efficient City*
- *Low-Cost & Healthy Housing*
- *Landscape & Townscape for Urban Sustainability*
- *Traditional Settlement & Cultural Heritage*
- *Rural Development*
- *Tourism Management*
- *Outdoor Comfort*

**CIVIL ENGINEERING & INFRASTRUCTURE**

- *Coastal Engineering*
- *Ecological Construction Material*
- *Construction Management & Work Safety*
- *River Management & Engineering*
- *Urban Electricity & Telecommunication System*
- *Urban Fire Safety Management*
- *Urban Drainage Engineering*
- *Traffic Management & Safety*
- *Road Engineering*
- *GIS, Remote sensing & Geo-mapping*
- *Soil science, Geotechnical & Underground Construction*

**ENVIRONMENTAL SCIENCE & PUBLIC HEALTH**

- *Governmental Policy in Climate Change & Global Warming*
- *Waste Management (re-use, reduction & recycling)*
- *Pollution Control Technology*
- *Urban Pollution & Health effects*
- *Environmental Education*
- *Environmental Impact Assessment Models*
- *Ecosystems analysis, Ecotoxicology and protection for the living environment*
- *Environmental economics*
- *Ecosystems analysis, Ecotoxicology and protection for the living environment*
- *Environmental economics*
- *Environmental Management, Restoration & Legislation*

**MECHANICAL ENGINEERING**

- *Ergonomics /Biomechanics*
- *Renewable Energy*
- *Automatic/ Robotic*
- *Energy Conversion Technology*
- *Refrigeration & Air Conditioning*
- *Industrial Management & Processing*
- *Applied Computational Fluid Dynamics (CFD)*
- *Material Properties & Durability*

**ELECTRICAL ENGINEERING**

- *Hydro electric technology*
- *Photovoltaic Technology*
- *Expert System*
- *Lighting Technology*
- *Electricity Forecasting*

- *System Stability, Analysis & Protection*
- *Power Plants technology & management*
- *Economic Evaluation of Power Systems and Utilities*
- *Informatics Technology*

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■ **CONFERENCE COMMITTEE:**

■ **CONFERENCE ADVISOR:**

- 
- *Professor Dr. Ir. Ellen J. Kumaat, Dean of Faculty of Engineering, Sam Ratulangi University, Manado.*

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■ **ORGANIZING COMMITTEE:**

- 
- *Professor Dr. Sangkertadi, Faculty of Engineering, Sam Ratulangi University,*
  - *Prof. Dr. Doddy Sumajouw, Faculty of Engineering, Sam Ratulangi University,*
  - *Dr. Linda Tondobala, Faculty of Engineering, Sam Ratulangi University*
  - *Dr. Aristotulus E. Tungka, Faculty of Engineering, Sam Ratulangi University,*
  - *Dr. Steenie Wallah, Faculty of Engineering, Sam Ratulangi University,*
  - *Dr. Veronica Kumurur, Faculty of Engineering, Sam Ratulangi University,*
  - *Dr. Tiny Mananoma, Faculty of Engineering, Sam Ratulangi University, Manado,*
  - *Cynthia Wuisang, M.Sc, Faculty of Engineering, Sam Ratulangi University*
  - *S T Gideon Kaunang, M.Eng, Faculty of Engineering, Sam Ratulangi University*
  - *Kenny Lempoy, M.Eng, Faculty of Engineering, Sam Ratulangi University*

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■ **TECHNICAL CONFERENCE CHAIR:**

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- *Dr. Abdelnaser Omran Al Amroni, School of Housing, Building and Planning, Universiti Sains Malaysia.*

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■ **INTERNATIONAL SCIENTIFIC COMMITTEE MEMBERS:**

- 
- *Professor Ir. Dr. Mahyuddin Ramli, School of Housing, Building and Planning, Universiti Sains Malaysia, Malaysia.*
  - *Professor Dr. Hamidi Abdul Aziz, Environmental Engineering, School of Civil Engineering, Universiti Sains Malaysia, Malaysia.*

□ Professor Dr. Mariana Gavrilescu, Chemical and Environmental Engineering, "Gheorghe Asachi" Technical University of Iasi, Faculty of Chemical Engineering and Environmental Protection, Department of Environmental Engineering and Management, Iasi, Romania.

□ Professor Dr. Abdullah Mahmood, Project Management, College of Planning and Architecture, King Saud University, Saudi Arabia.

□ Associate Professor Dr. Said Mohammed Al Abidi, Dental Science and Materials, Faculty of Medicine, Department of Dental, Garyounis University, Libya.

□ Associate Professor Dr. Claudiu Chiru, Computer Sciences, University Spiru Haret, Costanta, Romania.

□ Professor Dr. Ismail Said, Dep. Of Landscape Architecture, Faculty of Built Environment, Universiti Teknologi Malaysia, Skudai, Johor, Malaysia

□ Dr. Odile Schwarz-Herion, MBA, Sustainable Development Consultant, Germany

□ Dr. Julijana SILJANUSKA, Faculty of Administration and Management Information System, University of "St. Kliment Ohridski" – Bitola, Republic of Macedonia.

□ Associate Professor Dr. Julaihi bin Wahid, School of Housing, Building and Planning, Universiti Sains Malaysia.

□ Associate Professor Dr. KISS Imre, University Polytechnic Timisoara, Faculty of Engineering Hunedoara, Department of Engineering and Management, Romania.

□ Prof. Dr. RM. Soegijanto, Bandung Institute of Technology (ITB), Bandung, Indonesia.

□ Prof. Dr. H.M. Ramli Rahim, Hasanuddin University, Makassar, Indonesia.

□ Prof. Dr. Prasasto Satwiko, Atma Jaya Christian University, Yogyakarta, Indonesia.

□ Prof. Dr. Tri Harso Karyono, BPPT/Tarumanagara University, Indonesia

□ Dr. Ing. Eka Setiadi Rasyad, Department of Architecture, Trisakti University, Jakarta, Indonesia.

□ Dr. Egor Sidorov, Jan Evangelista Purkyne University, Usti nad Labem, Czech Republic.

□ Associate Professor Dr. Maczej GORA, Faculty of Chemistry, Department of Organic Chemistry, Jagiellonian University, Kraków, Poland.

□ Professor Dr. Elena Druica, Department of Economics, Faculty of Administration and Business, University of Bucharest, Romania.

□ Dr. Violaine Mijno, Laboratoire de Géologie HydrASA, Limoges Cedex, France.

□ Dr. Abdelhaq Kabbabi, Centre for Studies and Research Mineral Phosphate, Casablanca, Morocco.

□ Assoc. Prof. Dr. Giovanni Dotelli, Department of Chemistry and Chemical Engineering "G. INSTM R.U. – Polimi, Politecnico di Milano, Milano Italy.

□ Prof. Dr. Mohd. Hamdan Ahmad, Dept. of Architecture, Faculty of Built Environment, Universiti Teknologi Malaysia (UTM) Skudai, Johor, Malaysia

**IMPORTANT DATES:**

Deadline for Abstract submission 20 Aug 2009  
Reply to Authors for Abstracts acceptance 31 Aug 2009

Full paper submission 10 Sep 2009

Reply to Authors with reviewer's comments 20 Sep 2009

Final paper submission 30 Sep 2009

Conference date 26-27 Oct 2009

**INSTRUCTION TO AUTHOR:**

An abstract should consist of 250-300 words, and the author should state the objective, theoretical framework, methodology, data sources, results, and applications in his/her paper.

Please write your name (s), affiliation (s), address (es), phone, fax, e-mail address at the end of the page.

Full Papers of not more than 14 pages, singled spaced with Times New Roman Font 10 (2.5 cm all margins) should reach the Technical Conference Chair not later than 10, September 2009. All the papers presented at the conference will appear in the proceedings. CD-ROM and abstracts will be distributed to the conference participants.

**BENEFITS OF ATTENDING:**

The conference will be of interest to planners, environmentalists, engineers, architects, ecologist, economists, policy makers and other governmental officials, researchers and academics involved in the field of the sustainability. However, attending this conference will benefit you as follows:

- ✚ *Keep up to date with the latest advances in the field.*
- ✚ *Present your research within a unique forum.*
- ✚ *Collaborate with experts from around the world.*
- ✚ *Your conference paper will be reviewed by members of the committee and other colleagues and best quality of the papers will be selected for publication in the JOURNAL OF ARCHITECTURAL, SCIENCE, URBAN SETTLEMENT AND ENVIRONMENT, ISSN 1858-1137. Dr. Aristotulus E. Tunga ([matrasain@yahoo.com](mailto:matrasain@yahoo.com)), the EDITOR-IN-CHIEF, will be in charge of the communication with the members of the international Scientific Committee and authors.*
- ✚ *Participants who presented papers at **CONVEESH'09** conference will be considered for waiving their fees in the upcoming events of **CONVEESH' 2011**.*

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■ **SECRETARIAT:**

LAB. SAINS & TEKNOLOGI BANGUNAN,  
 FAKULTAS TEKNIK,  
 UNIVERSITAS SAM RATULANGI,  
 JALAN KAMPUS, BAHU, MANADO 95115, INDONESIA

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■ **SUBMISSION:**

*An abstract should consist of 250-300 words, and the author should state the objective, theoretical framework, methodology, data sources, results, and applications in his/her paper. Please write your name (s), affiliation (s), address (es), phone, fax, e-mail address at the end of the page.*

*Full Papers of not more than 12 pages, singled spaced with Times New Roman Font should reach the Technical Conference Chair not later than 10, September 2009. All the papers presented at the conference will appear in the proceedings. CD-ROM and abstracts will be distributed to the conference participants.*

*All professionals, environmentalists, researchers, and policy makers involved or interested in the area of the conference are invited to present papers relating to the conference topics. Authors are requested to submit abstracts, preferably by e-mail as a Word File attachment to the Technical Conference Chair (E-mail: [naser\\_elamroni@yahoo.co.uk](mailto:naser_elamroni@yahoo.co.uk)), by not later than August 20, 2009.*

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**VII<sup>th</sup> INTERNATIONAL CONGRESS  
"MACHINERY, TECHNOLOGY, MATERIALS"  
– INNOVATIONS FOR THE INDUSTRY**



**26. – 28.05.2010  
SOFIA, BULGARIA**

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■ **INVITATION**

The SEVENTH INTERNATIONAL CONGRESS "MACHINERY, TECHNOLOGY, MATERIALS'10" will be carried out together with the EXHIBITION OF MECHANICAL ENGINEERING MECHTECH'10 in Inter Expo Center Sofia.

Together and collaborating these two events will form the industrial forum "MACHINERY, TECHNOLOGY, MATERIALS – INNOVATIONS FOR THE INDUSTRY". We hope that in this way the Congress will become a bigger innovation mediator between scientific research and industry.

The program of the Congress offers you different ways to present the results of your research in front of you colleagues and the representatives of the industry. We invite you to take advantage of these opportunities.

Beside the international congress **MTM'10** and MECHTECH'10 the INDUSTRIAL FORUM includes: EXHIBITION MECHTECH in the halls of INTER EXPO & CONGRESS CENTER OF SOFIA and Innovations exchange and consulting services for the Industry.

We invite you to take part (personally or by correspondence) in the VII INTERNATIONAL CONGRESS **MTM'10** with publishing of your papers or messages on innovative technical solutions for the industry. You are welcome to participate either in the common stand "SCIENTIFIC INNOVATIONS FOR THE INDUSTRY" which is organized by us.

■ **TOPICS:**

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01. MACHINES
  02. TECHNOLOGIES
  03. MATERIALS

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■ **SCIENTIFIC PROGRAM:**

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- ✚ *PLENARY SESSION with ordered papers*
  - ✚ *SECTIONAL SESSIONS in the congress halls of Inter Expo & Congress center*
  - ✚ *POSTER PRESENTATIONS OF PAPERS at the congress stand in the exposition of the Forum*
  - ✚ *Participation with models, prospects, samples and/or multimedia presentations at the “SCIENTIFIC INNOVATIONS FOR THE INDUSTRY stand in the Forum’s exposition.*
- OFFICIAL LANGUAGES AT **MTM’10**: BULGARIAN, RUSSIAN, ENGLISH*
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■ **PUBLICATIONS:**

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- ✚ *In separate volume ISSN 1310-3946 of the proceedings for each topic session, which will be lodged in St.St. Cyril and Methodius National Library and Central Scientific-technical Library in Bulgaria*
  - ✚ *In CD, containing all papers.*
  - ✚ *Detached issue of the International virtual scientific-technical journal “MACHINERY, TECHNOLOGY MATERIALS” (ISSN 1313-0226). This publishing is at will and requires additional payment.*
  - ✚ *Author’s scroll, containing the title page, the content of the volume and printed copy of the author’s paper with the page numbers from the Proceedings.*
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■ **IMPORTANT DATES:**

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- ✚ *Sending the full text of the paper and Application Form “A”: 15.02.2010*
  - ✚ *Confirmation of the paper receiving: 01.03.2010*
  - ✚ *Payments and Application Form “B”: 15.03.2010*
  - ✚ *Announcement of the plenary and sectional sessions program on our web page: 15.04.2010*
  - ✚ *The Organizing Committee will receive posters up to: 15.04.2010*
  - ✚ *Receiving of the application for transfer: 14.05.2010*
  - ✚ *Registration of the participants: 25 and 26.05.2010*
  - ✚ *Opening of the congress: 26.05.2010*
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■ **TIME AND SPACE:**

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*26 - 28. 05. 2010,  
Inter Expo Centre,  
bul. „Tzarigradsko shose” №147,  
SOFIA – BULGARIA*

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■ **SECRETARIAT:**

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*SCIENTIFIC-TECHNICAL UNION OF MECHANICAL ENGINEERING  
108 RAKOVSKI STR.,  
1000 SOFIA  
TEL./FAX (+ 359 2) 986 22 40,  
TEL. (+ 359 2) 987 72 90  
[nts-bg@mech-ing.com](mailto:nts-bg@mech-ing.com) ,  
[www.mech-ing.com/mtm](http://www.mech-ing.com/mtm)  
Skype: NTSMashinostroene*



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**2<sup>ND</sup> INTERNATIONAL CONFERENCE  
FOR ENTREPRENEURSHIP, INNOVATION  
AND REGIONAL DEVELOPMENT  
- ICEIRD 2009**



**THEME:**  
**ENTREPRENEURSHIP AND INNOVATION CROSSROADS:  
TRIGGERS, CATALYST AND ACCELERATORS  
FOR SUSTAINABLE REGIONAL DEVELOPMENT**  
**24-25 APRIL 2009,  
THESSALONIKI, GREECE**

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■ **SCOPE AND AIMS**

*ICEIRD 2009 aims to provide an effective channel of communication between decision-makers (government, ministries and state agencies), researchers (universities, research and development centres, start-up centres and incubators), practitioners (SME leaders and managers) and persons concerned with the latest research, scientific development and practice on innovation and entrepreneurship in order to discuss topics that are of currency, relevance and significance for national competitiveness as well as sustainable, robust, and equitable regional development. ICEIRD09 aims to:*

- *address key factors in regional economic development, entrepreneurial vitality and innovation processes*
- *raise the level of awareness about innovation, entrepreneurship and competitive advantage*

- *strengthen the regional and international network among representatives from SEE countries and those from EU member states*
- *consolidate intra-SEE networks of SMEs, Start-up Centers and Incubators*
- *understand cultural and national barriers of entrepreneurship in the global economy*
- *promote best practices in innovation research and business development*
- *facilitate regional partnerships and innovation networks*

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■ **MISSION:**

*Mission of the International Conference for Entrepreneurship, Innovation and Regional Development (ICEIRD) is to strengthen the entrepreneurial spirit and help develop and sustain economic growth by fostering innovation, through the academic knowledge and expertise. ICEIRD Consortium has been established to provide a multi-disciplinary and cross-sectoral forum for researchers, practitioners, and policy makers in the field of innovation and regional development, and a means for sharing findings that promote innovation and therefore enhance economic, technological and regional socio-economic development through new economic activities that stimulate generation of wealth through entrepreneurial and sustainable employment and growth and thus increase competitiveness as well as civil society development and enhancement via the inter-networking of disciplines, researchers, policy makers and practitioners in diverse countries in the region.*

*The ICEIRD Consortium drives research agenda in the field of technology, innovation and entrepreneurship and regional economic development. It is one of the premium and pioneering consortia that successfully and effectively link theory and practice through well-established research outputs and annual meetings.*

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■ **GOALS:**

*The objective of ICEIRD Consortium is to establish an effective channel of communication between policy makers, government agendas, academic and research institutions and persons concerned with the latest research, scientific development and practice on innovation and regional development, with the following goals:*

- *To bridge the gap between academic and industry through applied research on technology, innovation and entrepreneurship and regional economic development*
- *To foster knowledge transfer and collaboration between the academic and industry sectors in emergent technology, system and model contexts*
- *To organize annual conferences/workshops to meet with members and participants and disseminate latest research and practice*
- *To publish results of projects in quality academic and professional journals, books, handbooks, proceedings, and reports.*
- *To generate funding from sources such as local government and research councils for furthering and developing new projects that could benefit the regional and country economy and industry by sharing of experiences and know-how between regions and countries*
- *To work in partnership with industry on specific entrepreneurial challenges, or innovative ideas*
- *To drive international research collaboration on projects related to innovation and regional development.*
- *To serve as the resources and expertise's hub on entrepreneurship and innovation by providing an ICEIRD consortium platform and a knowledge bank.*
- *To infuse and pump knowledge and expertise into improving the competitiveness of enterprises in developing countries.*
- *To be the first successful international network that enables exchange and transfer of knowledge, expertise and resources between developed and developing countries (the real global innovative chain)*

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■ **TOPICS:**

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**CREATIVITY, COMPLEXITY AND COMPETITIVENESS ISSUES FOR SMALL AND MEDIUM ENTERPRISES (SMEs) IN SEE vs. OTHER REGIONS (EU AND OTHER)**

- *Managing and Leveraging Complexity, Creativity and Innovation in SMEs*
- *Trust, Respect, Culture and Collaboration Issues for SMEs in SEE vs. other regions (EU and other)*
- *Leadership and Management practices that can be applied to SMEs*
- *SME Knowledge management and technology transfer*
- *SME Business process modeling*
- *New Technology Ventures Financing*
- *Business incubation management and leadership*
- *Human Resources Practices for promoting innovation for SMEs*

**SOUTH EAST EUROPEAN ENTREPRENEURIAL INNOVATION CLUSTERS**

- *SMEs' Entrepreneurship as an Innovation Driver*
- *Opportunities and barriers for closer cooperation between South East European SMEs in Innovation & Entrepreneurship:*
- *Strategic Integration vs. Flexibility and SME Competitiveness*
- *Innovation Clusters, Technology Transfer and Social Entrepreneurship*
- *Social Networking as Driver of EICs formation*
- *Science & Technology Parks and EICs*
- *Young and Women Entrepreneurs development via EICs*
- *Benchmarking of Entrepreneurship and Innovation Best Practices in the region*
- *Innovation policy in SMEs*

**TECHNOLOGY INNOVATION, TRANSFER AND COMMERCIALIZATION ACROSS GOVERNEMENT, UNIVERSITY, INDUSTRY DOMAINS**

- *The role of the State and Public Policy with regards to SME Innovation and Entrepreneurship*
- *Governmental and regional policies on entrepreneurship and innovation*
- *Entrepreneurial Universities and Entrepreneurial Innovation Clusters*
- *Entrepreneurship education, University – Industry collaboration*
- *ICT and SME Regional competitiveness*
- *SMEs and the role of the Innovation Zone (business centers and incubators)*
- *Intangibles Valuation and Intellectual Property Rights*

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■ **CONFERENCE CHAIR:**

*PANOS KETIKIDIS (CITY COLLEGE),*

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■ **CONFERENCE CO-CHAIRS (ORGANISATION):**

*THANOS HATZIAPOSTOLOU (CITY COLLEGE),*

*FOTIS MISOPOULOS (CITY COLLEGE)*

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■ **PROGRAMME COMMITTEE:**

*ELIAS CARAYANNIS (GEORGE WASHINGTON UNIVERSITY),*

*SIAU CHING LENNY KOH (UNIVERSITY OF SHEFFIELD),*

*NICOS KOMNINOS (ARISTOTLE UNIVERSITY OF THESSALONIKI),*

*RADMIL POLENAKOVIK (SS. CYRIL AND METHODIUS UNIVERSITY),*

*JAKA VADNIAL (GEA COLLEGE FOR ENTREPRENEURSHIP),*

*COTET DOMNICA (MECHANICAL RESEARCH ENGINEERING INSTITUTE),*

*PETKO RUSKOV (SOFIA UNIVERSITY),*

*ZORAN ANISIC (UNIVERSITY OF NOVI SAD),*

LUKE PITTAWAY (GEORGIA SOUTHERN UNIVERSITY),  
COLLIN WILLIAMS (UNIVERSITY OF SHEFFIELD),  
ARI-VEIKKO ANTIROIKO (UNIVERSITY OF TAMPERE),  
ROBERT HUGGINS (UNIVERSITY OF WALES INSTITUTE),  
ROUMEN NIKOLOV (UNIVERSITY OF SOFIA),  
ZENON MICHAELIDES (UNIVERSITY OF LIVERPOOL),  
LEON OERLEMANS (TILBURG UNIVERSITY)

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■ **LOCAL ORGANISING COMMITTEE:**

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ANNA SOTIRIADOU (CITY COLLEGE),  
NIKOS ZAHARIS (SEERC),  
STELIOS KEHAGHIAS (CITY COLLEGE),  
LESLIE SZAMOZI (CITY COLLEGE),  
ALEXANDROS PSYCHOGIOS (CITY COLLEGE)

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■ **SUBMISSIONS, REVIEW AND PROCEEDINGS:**

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Authors are invited to submit a full paper of 6-10 pages. Submitted papers, which will go under blind review by at least two referees.

Following acceptance, authors are asked to prepare a camera ready paper in a predefined format. The Conference Proceedings, including all papers presented will be published as a SEERC book edited by the Conference Chairs. Selected papers will be published in a special issue of the International Journal for Innovation and Regional Development (IJIRD) Interscience Publisher Ltd. The official language of the conference is English.

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■ **IMPORTANT DATES:**

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**SUBMISSION OF FULL PAPERS:** 12 JANUARY 2009

**NOTIFICATION OF ACCEPTANCE:** 23 FEBRUARY 2009

**SUBMISSION OF CAMERA READY PAPER:** 10 MARCH 2009

**EARLY REGISTRATION AND AUTHOR REGISTRATION:** 16 MARCH 2009

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■ **SECRETARIAT:**

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**2ND INTERNATIONAL CONFERENCE ON ENTREPRENEURSHIP,**

**INNOVATION AND REGIONAL DEVELOPMENT**

CITY COLLEGE, AFFILIATED INSTITUTION OF THE UNIVERSITY OF SHEFFIELD

SOUTH-EAST EUROPEAN RESEARCH CENTER SEERC

THESSALONIKI,

24-25 APRIL 2009

Contact: [iceird2009@seerc.org](mailto:iceird2009@seerc.org)

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**3<sup>RD</sup> CONFERENCE with INTERNATIONAL PARTICIPATION  
MANAGEMENT of MANUFACTURING SYSTEMS**



**11 -12<sup>th</sup>, SEPTEMBER, 2008  
PREŠOV, SLOVAKIA**

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■ **LAST CALL – ANNOUNCEMENT**

The main topic of the conference is **ENVIRONMENTAL TECHNOLOGIES AND MANAGEMENT**. The Conference is conceived to contribute to fruitful exchange of the update theoretical and practical knowledge in the area of **ENVIRONMENTAL TECHNOLOGIES AND MANAGEMENT**. The conference enables participants to establish the contacts among scholastic, consulting and other researchers and practitioners from relevant disciplines related to the main topics of the conference. In this connection, the conference program will be focused on the environmental protection and workplace safety.

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■ **MAIN TOPICS:**

- 1 – MODERN WASTE TREATMENT TECHNOLOGIES
- 2 – RECYCLING TECHNOLOGIES IN MANUFACTURING
- 3 – AIR, WATER AND SOIL PROTECTION IN MANUFACTURING PROCESSES
- 4 – ENVIRONMENTAL MANAGEMENT SYSTEMS IN MANUFACTURING
- 5 – RISK MANAGEMENT IN MANUFACTURING
- 6 – TECHNOLOGIES AND EQUIPMENTS FOR ENVIRONMENT PROTECTION
- 7 – QUALITY MANAGEMENT SYSTEMS
- 8 – MODERN APPROACHES IN MANUFACTURING MANAGEMENT
- 9 – ENTERPRISE FIRE AND CIVIL PROTECTION
- 10 – ALTERNATIVE SOURCES IN MANUFACTURING – BIOMASS
- 11 – SAFETY, HYGIENE AND DESIGN OF WORKING ENVIRONMENT

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■ **CONFERENCE IS ORGANISED UNDER PATRONAGE OF:**

Prof. Ing. JOZEF NOVÁK-MARCINČIN, PhD.  
Dean of FACULTY OF MANUFACTURING TECHNOLOGIES  
TU KOŠICE WITH A SEAT IN PREŠOV.

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■ **CONFERENCE IS ORGANIZED BY:**

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*DEPARTMENT OF MANUFACTURING MANAGEMENT (KMV)  
FACULTY OF MANUFACTURING TECHNOLOGIES TU KOŠICE WITH A SEAT IN PREŠOV*

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■ **CONFERENCE CHAIRMEN:**

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*doc. Ing. Peter Oravec, CSc., KMV FVT TU v Košiciach with a seat in Prešov  
Ing. František Kurilla, Dr.Sc. , KMV FVT TU v Košiciach with a seat in Prešov  
Ing. Marián Flimel, CSc., KMV FVT TU v Košiciach with a seat in Prešov*

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Dr. Imre KISS UNIVERSITY POLITECHNICA TIMISOARA RO*

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■ **ORGANIZING COMMITTEE – Chairman:**

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*Ing. Marián FLIMEL, CSc.*

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■ **ORGANIZING COMMITTEE – Members:**

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*doc. Ing. Sergej HLOCH, PhD.  
Ing. Ladislav KOKOŠKA, CSc.  
Ing. Agáta RADVANSKÁ, PhD.  
RNDr. Iveta PANDOVÁ, PhD.  
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Ing. Renáta MADZINOVÁ  
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Ing. Peter KNUTH  
Ing. Lucia MICHALOVÁ  
Ing. Jozef HUSÁR  
Ing. Tomáš MAČEJ*

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*The conference will be on 11 - 12 SEPTEMBER 2008 under patronage of **prof. Ing. JOZEF NOVÁK - MARCINČIN, PhD.** - Dean of **FACULTY OF MANUFACTURING TECHNOLOGIES TU KOŠICE WITH A SEAT IN PREŠOV**. Conference organizer is **DEPARTMENT OF MANUFACTURING MANAGEMENT (KMV) of FACULTY OF MANUFACTURING TECHNOLOGIES OF TECHNICAL UNIVERSITY OF KOSICE WITH THE SEAT IN PRESOV***

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**The X<sup>th</sup> INTERNATIONAL SYMPOSIUM  
"YOUNG PEOPLE AND MULTIDISCIPLINARY RESEARCH"**

**ISYPMR - 2008**

13<sup>th</sup> – 14<sup>th</sup> NOVEMBER 2008

TIMISOARA, ROMANIA

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■ **ANNOUNCEMENT**

The SYMPOSIUM will be organised by the NATIONAL R&D INSTITUTE FOR WELDING AND MATERIAL TESTING – ISIM TIMIȘOARA, ASSOCIATION FOR MULTIDISCIPLINARY RESEARCH (ACM-V), UNIVERSITY "POLITEHNICA" OF TIMISOARA under de aegis of MINISTRY OF EDUCATION, RESEARCH AND INNOVATION.

Specialists from SERBIA, HUNGARY and BULGARIA will participate in the SYMPOSIUM together with the ROMANIAN specialists.

You are invited to participate at the X<sup>th</sup> INTERNATIONAL SYMPOSIUM "YOUNG PEOPLE AND MULTIDISCIPLINARY RESEARCH".

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■ **KEYWORDS:**

Scientific events, Multidisciplinary Research, Symposium, Scientific collaborations, Young People

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■ **GENERAL INFORMATIONS – AIMS**

The aim of the SYMPOSIUM is to create the framework for the presentation, debate and publication of the valuable scientific results obtained by both the young members of ACM-V and from other regions, beside those from SERBIA, HUNGARY and BULGARIA.

The Organization Committee propose that the X<sup>th</sup> SYMPOSIUM to be one of high scientific level and quality.

The criteria for the papers' estimation by the Scientific Committee are:

✚ interdisciplinary and multidisciplinary technical – scientific character

✚ high scientific level

✚ contribution brought to the solution of the proposed problem and/or development of the field.

You are invited to participate at the X<sup>th</sup> INTERNATIONAL SYMPOSIUM "YOUNG PEOPLE AND MULTIDISCIPLINARY RESEARCH".

The participants are asked to fill-in and mail the Registration form to the Secretariat of the ASSOCIATION FOR MULTIDISCIPLINARY RESEARCH OF THE WEST ZONE OF ROMANIA (ACM-V) located at TIMISOARA, Bv. MIHAI VITEAZUL nr. 30 and also to mail an abstract of the paper in ENGLISH (200 words at the most) specifying the section.

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■ **ORGANIZERS**

- ✚ NATIONAL R&D INSTITUTE FOR WELDING AND MATERIAL TESTING – ISIM TIMIȘOARA,
- ✚ ASSOCIATION FOR MULTIDISCIPLINARY RESEARCH (ACM-V),
- ✚ UNIVERSITY "POLITEHNICA" OF TIMIȘOARA
- ✚ BANAT'S UNIVERSITY OF AGRICULTURAL SCIENCES AND VETERINARY MEDICINE – TIMIȘOARA
- ✚ THE LOCAL COUNCIL OF TIMIȘOARA, TIMIȘOARA CITY HALL
- ✚ THE COUNTY COUNCIL OF TIMIS

under de aegis of

- ✚ MINISTRY OF EDUCATION, RESEARCH AND INNOVATION

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■ **MODEL FOR PAPER'S ELABORATION**

- ❖ The paper should contain max. 6 pages, size A4 (with figures and tables included in the text, including bibliography), with an even number of pages;
  - ❖ The paper should be edited on computer with Arial font, 12 pt. on size A4 with useful area of 24 cm × 16 cm (left, right and up 2.5 cm, down 3.0 cm);
  - ❖ The pages should be numbered by pencil;
  - ❖ The papers should be written in Word format;
  - ❖ The title of the paper should be written with capital letters (14 pt. - Bold), centred;
  - ❖ The paragraph title should be written with 12 pt. bold fonts and it might be centred.
  - ❖ Graphic materials should be exposed on transparent slides or Power Point presentation,
  - ❖ The presentation should take 10 minutes at the most
- The paper will be transmitted on CD and listed in one copy.  
An author can participate with two papers at the most.

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■ **TOPICS**

The programme of the Symposium contains papers in Plenary Session on the topic: „PRIORITIES OF THE EUROPEAN SCIENTIFIC RESEARCH”

Papers in sections of the X<sup>th</sup> INTERNATIONAL SYMPOSIUM “YOUNG PEOPLE AND MULTIDISCIPLINARY RESEARCH” will on the following topics:

- ✚ TECHNICAL SCIENCES
- ✚ CHEMISTRY, PHYSICS AND MATHEMATICS
- ✚ BIOLOGY, AGRICULTURE AND ANIMAL SCIENCE
- ✚ HEALTH (HUMAN AND VETERINARY)
- ✚ ECOLOGY AND ENVIRONMENT PROTECTION
- ✚ SOCIAL AND HUMAN SCIENCES.
- ✚ ECONOMIC SCIENCES

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**■ PRESIDENT OF THE ORGANISING COMMITTEE**

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*LECTURER DR. ENG. FLAVIU FRIGURĂ ILIASA – UNIVERSITY “POLITEHNICA” OF TIMIȘOARA*

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**■ REGIONAL ORGANIZING COMMITTEE**

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- *LECT. DR. ENG. RACKOV MILAN – UNIVERSITATEA NOVI-SAD – SERBIA*

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**■ DEADLINES**

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*The deadline for mailing the abstracts, in which, it will be showed the personal contribution of the authors and the interdisciplinary character: JULY 10<sup>th</sup> 2008.*

*The Scientific Committee will analyse the abstracts and communicate to the authors until the 10<sup>th</sup> of SEPTEMBER 2008 which are the selected papers, with a view to the final elaboration.*

*The deadline for mailing of the complete papers, edited according to the annexed model and the CD until: OCTOBER 5<sup>th</sup> 2008*

*The publication in volume or on CD of the papers will be decided by the Scientific Committee following the analysis of the complete papers mailed in time, if these fulfill the technical-scientific criteria and the elaboration mode.*

*Any correspondence should be addressed to the secretariat of the SYMPOSIUM, located at the ASSOCIATION FOR MULTIDISCIPLINARY RESEARCH (ACM-V). Bd. MIHAI VITEAZUL nr. 30, 300222 TIMISOARA, ROMANIA, Tel. (+40) - 0256 - 491840, fax (+40) - 0256 - 499149*

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■ **INFORMATION - CORRESPONDENCE**

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**ISYPMR - 2008**

**THE X<sup>TH</sup> INTERNATIONAL SYMPOSIUM**

**"YOUNG PEOPLE AND MULTIDISCIPLINARY RESEARCH"**

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***ANNALS of FACULTY ENGINEERING HUNEDOARA  
– JOURNAL of ENGINEERING”***



*since 2003*

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■ **DEAR COLLEAGUES,**

*“ANNALS OF FACULTY ENGINEERING HUNEDOARA – JOURNAL of ENGINEERING” is an international and interdisciplinary journal which reports on scientific and technical contributions.*

*Scientists and engineers with an interest in the respective interfaces of engineering fields, technology and materials, information processes, research in various industrial applications are invited to publish in our journal. “ANNALS OF FACULTY ENGINEERING HUNEDOARA – JOURNAL of ENGINEERING” publishes articles of interest to researchers and engineers and to other scientists involved with materials phenomena and computational modeling.*

■ **ABOUT THE “ANNALS OF FACULTY ENGINEERING HUNEDOARA – JOURNAL of ENGINEERING”**

*The “ANNALS OF FACULTY ENGINEERING HUNEDOARA – JOURNAL of ENGINEERING” (ISSN 1584 – 2665, for printed version, ISSN 1584 – 2673, for electronic format) has been published since 2003, in English, replacing the “ANNALS OF FACULTY ENGINEERING HUNEDOARA – JOURNAL of ENGINEERING” (ISSN 1454 – 6531), that appeared regularly since 1999, in Romanian. The “ANNALS OF FACULTY ENGINEERING HUNEDOARA – JOURNAL of ENGINEERING” has been issued on a regular basis since 2003, twice a year in printed form (FASCICULE 1 and FASCICULE 2) and once a year in electronic format (FASCICULE 3). We mention that our intention is to include the “ANNALS OF FACULTY ENGINEERING HUNEDOARA – JOURNAL of ENGINEERING” in the international databases, and this is the main reason we are trying to advertise it in ROMANIA and abroad. In the name of the FACULTY OF ENGINEERING HUNEDOARA, the entire professor’s collective, and, of course, in my personal name, we thank you for the attention. We are looking forward to a fruitful collaboration and we welcome you to publish in our “ANNALS OF FACULTY ENGINEERING HUNEDOARA – JOURNAL of ENGINEERING”. This JOURNAL is a good opportunity for the researchers to exchange information and to present the results of their research activity. We hope that it will be possible to initiate future research themes and projects in the frame of bilateral or multilateral basis, including participation in EUROPEAN UNION programs.*

Every year, in three issues, "ANNALS OF FACULTY ENGINEERING HUNEDOARA – JOURNAL of ENGINEERING" publishes a series of reviews covering the most exciting and developing areas of engineering. The result is a journal that gives the scientists and engineers the opportunity to keep informed of all the current developments in their own, and related, areas of research, ensuring the new ideas across an increasingly the interdisciplinary field.

"ANNALS OF FACULTY ENGINEERING HUNEDOARA – JOURNAL of ENGINEERING" encourages the submission of comments on papers published particularly in our journal. The journal publishes articles focused on topics of current interest within the scope of the journal and coordinated by invited guest editors. Interested authors are invited to contact one of the Editors for further details.

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#### ■ **ABOUT THE FACULTY OF ENGINEERING HUNEDOARA**

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The INSTITUTE OF TECHNOLOGICAL ENGINEERING OF HUNEDOARA was founded in 1970, pursuant of the Decision of the Council of Ministers. 1271/1970. In the beginning, this institute functioned with day and evening courses in two profiles: Metallurgy, with special training in Blast Furnaces and Steelworks and Thermal Deformations and Treatments, respectively Electromechanics, with special training in Technological Electromechanics. Along the years, we also had special training in Carbon-chemical Technologies and Civil, Industrial and Agricultural Constructions in the profile Constructions. Students used to be trained in day courses (3 years) and evening courses (4 years). Until 1974, The INSTITUTE OF TECHNOLOGICAL ENGINEERING OF HUNEDOARA was subordinated to the Mining Institute of Petroșani.

Starting university year 1974 – 1975, once the network of Institutes and Faculties belonging to the Ministry of Education and Schooling was approved through the Decree of the State Council no. 147/1974, The INSTITUTE OF TECHNOLOGICAL ENGINEERING OF HUNEDOARA was subordinated to the POLYTECHNIC INSTITUTE "TRAIAN VUIA" OF TIMIȘOARA.

The DEPARTMENT OF METALLURGY appeared in 1974, and was originally the DEPARTMENT OF TECHNOLOGY, created in 1971 one year after the INSTITUTE OF HIGHER EDUCATION was founded. The department ensures the education of the students of the FACULTY OF ENGINEERING OF HUNEDOARA in the field of metallurgical processes, plastic working and thermal treatments, ferrous and non-ferrous alloy casting, metallurgical equipment and aggregates, economical engineering in the field of mechanics, the chemical and material industry. The department coordinates the education in the fields of Engineering of Metallurgical Processes (Plastic Working and Thermal Treatments, Metal Casting), Economical Engineering in the Chemical and Material Industry and the Optimization of Metallurgical Processes and Master, being in charge with the drawing up of the curricula and the coordination of the professional instruction in these fields. Starting university year 1985 – 1986, the DEPARTMENT OF CASTING was added to the already existent profiles.

The FACULTY OF ENGINEERING OF HUNEDOARA started its activity in university year 1990 – 1991, when the INSTITUTE OF TECHNOLOGICAL ENGINEERING was restructured by Order of the Ministry of Education no. 7751/1990, which approved of the long term (5 years) higher education courses at the FACULTY OF ENGINEERING OF HUNEDOARA. The evening courses for technological engineers were maintained in parallel with the engineering day courses until all the students that had started studies before 1990 graduated.

The DEPARTMENT OF MECHANICS was founded in 1995, by splitting the DEPARTMENT OF ELECTRO-MECHANICS. The teaching staff of the department covers both the fundamental objects (Linear Algebra, Analytical and Differential Geometry, Mathematical Analysis, Special Mathematics, Numerical Analysis, Physical Education) and the technical objects in the field of study, according to the respective curricula: Electrical Engineering, Economical Engineering, Industrial Engineering, Mechanical Engineering, The Engineering of Transportation, Applied Sciences, and the Engineering of Materials. The DEPARTMENT has been coordinating from its foundation the specialization in "Equipment for Hot Processing" then, since university year 2001-2002, the specialization in "Economical Engineering in the Field of Mechanics" and finally, since university year 2003-2004, the specialization in "Automotive Vehicles", being particularly interested in the contents of the curricula and the corresponding analytical programs, as well as in the carrying out of the didactical and

*practical activities. For university year 2004-2005 we made the proper diligences meant to found and start the activity of a new post-university - Master course: "Advanced Methods and Means of Designing Mechanical Systems".*

*The DEPARTMENT OF ELECTROTECHNICS functions within the FACULTY OF ENGINEERING OF HUNEDOARA since 1995 as a result of the splitting of the Department of Electromechanics, namely: the teaching staff specialized in electricity, which at present constitutes most of the DEPARTMENT OF ELECTROTECHNICS and the teaching staff specialized in mechanics, belonging now to the DEPARTMENT OF MECHANICS. Within the DEPARTMENT OF ELECTROTECHNICS, besides the teachers specialized in electricity, also work the teachers of foreign languages, English and French and also the titular of the subject Physics. Until 2001 to this department also belonged the teaching staff of economic subjects, at present belonging to the DEPARTMENT OF METALLURGY. This department is also in charge with the TECHNICAL UNIVERSITY COLLEGE, which offers the following specializations: Technical Computer Science, Electronics, IT and Applied Electronics.*

*Starting university year 1993 – 1994, The TECHNICAL UNIVERSITY COLLEGE was founded, using the same human and material resources as the FACULTY OF ENGINEERING OF HUNEDOARA. Didactically and administratively, the TECHNICAL UNIVERSITY COLLEGE is subordinated to the FACULTY OF ENGINEERING. University year 2000 – 2001 meant for the FACULTY OF ENGINEERING OF HUNEDOARA the opening of the DEPARTMENT FOR LIFE LONG EDUCATION whose target is post-university professional reconversion of higher education graduates.*

*The research activity of the teaching staff is recognized by the NATIONAL COUNCIL OF SCIENTIFIC RESEARCH IN HIGHER EDUCATION INSTITUTIONS, which approved of the opening within the FACULTY OF ENGINEERING OF HUNEDOARA of a RESEARCH CENTER on "OPTIMIZATIONS IN THE INDUSTRY OF MATERIALS". The CENTER is involved in activities of material obtaining, automation, computer-controlled processes in material industry, endurance and safety in exploitation of materials. Since the founding of the higher education institution in HUNEDOARA, the research activity, alongside with the didactical one have been carried out starting from the needs of the industrial zone and the needs of self endowment of the departments. The DEPARTMENT OF ELECTRO-TECHNIQUES is endowed with laboratories specialized in the functioning of electric rotary machines and transformers, electric installations, electric and electronic circuits, data acquisition and processing systems, the analysis of the quality of electric energy for several consumers, the study of electromagnetic compatibility, the analysis and synthesis of automatic regulation systems for industrial processes using both classical regulation methods and methods based on the fuzzy logic, neuronal networks and experts systems.*

*In the laboratories of the DEPARTMENT OF METALLURGY research can be made in the field of chemistry, plastic deformations, studies related to the elaboration of ferrous and non-ferrous materials and thermal treatments.*

*The material resources and the infrastructure of the DEPARTMENT OF MECHANICS offer the possibility to perform mechanical trials at room and low temperatures, researches on the behavior of some machine parts in function (belts, bearings, springs, etc.) and the tribological analysis of the lubricants and various pairs of materials.*

*The buildings where the FACULTY OF ENGINEERING OF HUNEDOARA carries out its activity are all next to one another and they are: four buildings meant for didactical activities, one administrative building, two buildings meant for production and maintenance. Besides, the Faculty has one hostel with 38 rooms, 114 places and a canteen. Between 1973 – 1974, The IRON AND STEEL INTEGRATED PLANT OF HUNEDOARA donated the necessary funds for constructing three-storey building B, and the technological shed, having a total area of 1100 sq.m. Between 1977 – 1978, using funds offered by the Ministry of Education, we constructed in the same area three-storey building C, having a surface of 990 sq.m. and a gym hall with a surface of 600 sq.m. In the six amphitheatres, one auditorium, fourteen seminar rooms, one gym hall and thirty laboratories, we can grant the teaching process, five days a week, 4-8 hours a day. The FACULTY OF ENGINEERING OF HUNEDOARA has a library with a surface of 262 sq.m., and the book depot, with a surface of 130 sq.m. has over 95,000 volumes in store, respectively more than 42,000 titles.*

*Starting 1999, our Faculty has been organizing sessions of scientific communications to which participate teaching staff and researchers from numerous countries. The scientific papers presented*

on these occasions are published in the "ANNALS OF FACULTY ENGINEERING HUNEDOARA – JOURNAL of ENGINEERING", ISSN 1454 – 6531. The results of the research activities that are made public on these occasions lead to an increase of the prestige which the FACULTY OF ENGINEERING OF HUNEDOARA enjoys. The DEPARTMENT OF LIFE LONG EDUCATION of the FACULTY OF ENGINEERING OF HUNEDOARA was founded in the spring of 2000 as a result of the need to create a center in this area, capable of offering the possibility of initial or continuous professional formation, or for the re-conversion of the workforce laid off, to top fields of activity or domains that offer a sure perspective in the near future.

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■ **INVITATION**

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Now, when you know us, in this way, you are invited to present your activity covering the full spectrum of engineering. "ANNALS OF FACULTY ENGINEERING HUNEDOARA – JOURNAL of ENGINEERING" is an international and interdisciplinary journal which reports on scientific and technical contributions. Thank you in advance for selecting us.

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