

# **FACULTY OF ENGINEERING IN HUNEDOARA**



**Str. Revoluției, Nr. 5  
331128 – Hunedoara, Romania  
Tel: +40-254-207500, +40-254-207505  
Fax: +40-254-207501**

**E-mail: [decanat@fih.utt.ro](mailto:decanat@fih.utt.ro)  
Web: [www.fih.utt.ro](http://www.fih.utt.ro)**



## RESEARCH CENTER OPTIMIZATIONS IN THE INDUSTRY OF MATERIALS

### GENERAL PRESENTATION

The Research Center “Optimizations in the Industry of Materials” is recognized by the National Board of Higher Education Scientific Research through certificate No. 100/CC-C of 11.05.2001. It is established at the Faculty of Engineering in Hunedoara and it includes staff involved in the research activity in the fields of electrotechnics, mechanics and metallurgy.

The Electrotechnics Department has specialized laboratories for researches on the functioning of the rotative electric equipment and transformers, electrical equipment, electric and electronic circuits, for carrying out the achievement and processing of data, the analysis of the quality of the electric power of different consumers, studying the electromagnetic compatibility, the analysis and synthesis of the automatic adjustment of the parameters of the industrial processes, using the classic adjustment methods, as well as new methods, based on the fuzzy logic, neuronal networks, expert systems.

In the laboratories of the Metallurgy Department, the teaching staff can carry out researches in the fields of chemistry, plastic deformation, studies related to the elaboration of iron and non-ferrous materials, thermal treatments and economic researches (prognosis, diagnosis etc.).

The material resources and infrastructure of the Mechanics Department ensures the possibility of carrying out mechanic tests at the surrounding temperature and low temperatures, the research of the behavior of some machinery parts (belts, bearings, springs etc.) during functioning and the tribologic analysis of lubricants and various pairs of materials.

### MISSION

The Research Center “Optimizations in the Industry of Materials” offers the framework for scientific research and human resources formation activities in the fields of electrotechnics, mechanics and metallurgy.

The research activity carried out within the research center is strictly related with the teaching process and aims at:

- solving research topics in the field of materials
- forming specialists who may contribute, through their qualification and performances, to the enlargement of the state of knowledge

- raising the competitiveness of the Faculty of Engineering in Hunedoara on the qualifications market requested by the market economy
- forming of elites within the young generation
- obtaining outside the budget incomes for the modernization of the laboratory infrastructure.

### FIELDS OF RESEARCH

The main research field is the materials behavior study, the center being recognized in the following sub-fields: the behavior of materials at various temperatures, the automatic adjustment of the industrial processes, the raise of the availability of materials, technologies for obtaining materials.

### KEYWORDS

Electric furnaces, electronic relays, electronic protection, adjustable electric drives, artificial intelligence, expert systems, reliability, availability, cryogenic environments, metallurgical processes.

### ACTIVITIES

- study about thermal fatigue and endurance of rolls for rolling mills
- designing and setting-up an optimal controlling system of the lamination process using computing technique, in order to minimize the electric power consumption
- advanced controlling system of the continuous casting processes
- studying the reliability and availability of the metallurgical entities
- determining the behavior of the metallic materials at low temperatures
- recycling of waste materials
- improving the quality of the products obtained through casting and/or plastic deformation.

### RESEARCH PROJECTS

1. Grant CNCSIS 24/22.06.2004: *Endurance research about running of rolls for hot rolling mills*; Value: 60,000,000 ROL
2. Grant CNCSIS 191 / 32940 / 22.06.2004: *Research and experiments about improvement of steel ingots' structure*; Value: 7,500,000 ROL
3. RELANSIN Programme, 1362 / 26.07.2001 - 2004: *Improvement of quality indicators for the electric steel plants energy and their*

*impact on technological process effect*; Value: 1,300,000 ROL

4. Contract no. 24 / 21.04.2004: *Research about recycling the dust of steel plants in iron and steel industry*; Beneficiary: the European Environment Agency; Value: 1,000 €
5. Contract no. 1180 / 03.09.2004: *Research regarding the influence of local compression effect on the endurance of steel cables' wire rod*; Beneficiary: S.C. „SIDERMET” S.A. Călan; Value: 6,000,000 ROL

## PUBLICATIONS

### BOOKS

1. Iordan, A., Cristea, D., Berdie, A., *Computer programming*, Mirton Publishing House, Timișoara, 2004, 185 pages, ISBN 973-661-331-3 (published in Romanian)
2. Lemle, D.L., *Lessons of analytical geometry*, Mirton Publishing House, Timișoara, 2004, 91 pages, ISBN 973-661-520-0 (published in Romanian)
3. Maksay, Șt., Stoica, D., *Mathematical software*, Mirton Publishing House, Timișoara, 2004, 154 pages, ISBN 973-661-515-4 (published in Romanian)
4. Pinca-Bretotean, C., Toader, Șt., Pleșa, D., *Thermal fatigue of rolls for hot rolling mills*, Politehnica Publishing House, Timișoara, 2004, 222 pages, ISBN 973-625-185-3 (published in Romanian)
5. Ardelean, E.D., *Casting of the semi-finished steel products*, Mirton Publishing House, Timișoara, 2004, 171 pages, ISBN 973-661-544-8 (published in Romanian)
6. Negomireanu, B., *Initiation in capital market and stock exchange*, Mirton Publishing House, Timișoara, 2004, 200 pages, ISBN 973-661-312-6 (published in Romanian)
7. Rațiu, S., *Thermal fields at steel heating for plastic deformation – numerical simulation*, Mirton Publishing House, Timișoara, 2004, 176 pages, ISBN 973-661-456-5 (published in Romanian)
8. Socalici, A., *Structure of steel ingots*, Mirton Publishing House, Timișoara, 2004, 200 pages, ISBN 973-661-543-X (published in Romanian)
9. Dascăl, A., Babeu, T.D., *The hardness tests under high temperatures*, Proceedings of the 10<sup>th</sup> International Symposium on Experimental Stress Analysis and Material Testing, 21–23 Oct. 2004, vol.I, Sibiu, ISBN 973-651-918-X, pp. 359
10. Dascăl, A., Pinca-Bretotean, C., *The behavior on shock bending of OLT 45K steel under high temperature*, Proceedings of the 10<sup>th</sup> International Symposium on Experimental

### PUBLISHED PAPERS

1. Pinca-Bretotean, C., *Contributions at scientific development of research regarding to endurance of rolls on running for hot rolling mills*, 9<sup>th</sup> International Conference, Târgu Jiu, 2004, pp. 75 – 81
2. Pinca-Bretotean, C., *Research about endurance of rolls for hot rolling mills*; MASINSTVO, Nr.3, 2004, pp. 177 – 188
3. Miklos, I., *Current trends of research about dynamic behavior of catenary suspension unit – pantograph in the electric railway traction*, Debates of the 4<sup>th</sup> National Conference, with international participation under the title of „Professor Dorin Pavel – founder of the Romanian Hydro-energetics”, Sebeș, 2004, pp. 391 – 396
4. Alic, C., *Case studies with respect to appraisal of exploitation security of some metallic material resistance structures*, Debates of the 4<sup>th</sup> National Conference, with international participation under the title of „Professor Dorin Pavel – founder of the Romanian Hydro-energetics”, Sebeș, 2004, pp. 179 – 184
5. Alic, C., *Experimental research about metallic material from the elements of resistance structures in exploitation*, International scientific conference research and development of mechanical elements and systems, September 2004, Kradujevac, Serbia & Montenegro, pp. 101-107
6. Miklos, Z., *Computer programming of straight shafts*, Debates of the 4<sup>th</sup> National Conference, with international participation under the title of „Professor Dorin Pavel – founder of the Romanian Hydro-energetics”, Sebeș, 2004, pp. 485 – 490
7. Miklos, Z., *Modelling and analysis plan mechanisms Adams 12*, International Symposium „Young People Multidisciplinary Research” 24–25 September 2004, Timișoara, Sudura (Welding) Publishing House, ISBN 973 – 8359 – 26 – 0, pp. 192 – 197
8. Weber, Fr., *Considerations regarding to mechanical tests under low temperatures, by Romanian Standard*, Debates of the 4<sup>th</sup> National Conference, with international participation under the title of „Professor Dorin Pavel – founder of the Romanian Hydro-energetics”, Sebeș, 2004, pp. 71 – 76

- Stress Analysis and Material Testing, 21–23 Oct. 2004, vol.I, Sibiu, ISBN 973-651-918-X, pp. 363
11. VasIU, T., *Appreciations with respect to surface status of the wire-guide friction couple*, Annals of the Faculty of Engineering Hunedoara, Tom II, Fasc 2, 2004, pp. 34-37
  12. VasIU, T., Budiul-Berghian, A., *Study about availability of ball mills*, Mines Journal, no. 3 (153), 2004, pp. 25-27
  13. BaciU, I., Pănoiu, M., Pănoiu C., *Quality analysis of the electric power for railway stations*, AQTR 20042004-IEEE-TTTC-International Conference on Automation, Quality and Testing, Robotics, May 13-15, 2004, Cluj-Napoca, Vol I, pp. 501-503
  14. BaciU, I., Pănoiu, M., Pănoiu C., *Using passive filters for current harmonics decrease on the railway systems line feed*, Bulletin of the Politechnical Institute in Iasi, 2004, Vol. L(LIV), Fasc. 5C, pp. 1107-1112
  15. Diniș, C., *Implementation of the C167 micro-controller in the process management of sintering plants*, UNIVERSITARIA ROPET 2004 International Multi-curricular Scientific Symposium in Petroșani, 15-16 October 2004, pp. 183-188
  16. Cristea, D., Berdie, Adela, *Remote control of the equipment by computer programming*, Proceedings of the 4<sup>th</sup> National Conference with international participation - Prof. Dorin Pavel, Sebeș, 2004, pp. 409-412
  17. Gherman, L., Deaconu, S., *Numerical analysis of the three-phase trunks*, Debates of the 4<sup>th</sup> National Conference 2004 under the title of „Professor Dorin Pavel – founder of the Romanian Hydro-energetics”, pp. 129-132
  18. Anghel, S., Rusu, N., *Advanced control of the ferrous ore sintering process*, AQTR 2004 – THETA 14, Proceedings of 2004 IEEE-TTTC International Conference on automation, quality and testing, robotics, Cluj, 2004, pp. 321-227
  19. Deaconu, S., Babău, R., *Automation of micro-hydroelectric power plants*, „Automation and Instrumentation” Journal, no. 5, 2004, pp. 15-17
  20. Deaconu, S., *Computer simulation of the mini hydroelectric plants which run with variable speed in autonomous regime and coupled to the electric network*, Bulletin of the Politechnical Institute in Iasi, Vol. L(LIV), Fasc. 5A, 2004, Energetic Electro-technics. Electronics, pp. 219-221
  21. Muscalagiu, I., Muscalagiu, D., Panoiu, M., Jordan, A., *Educational Software Meant for the Implementation and Evaluation of the Asynchronous Techniques of the ABT Family*, Created in NetLogo, Annals of the Faculty of Engineering Hunedoara, Tome II, Fasc 2, 2004, pp. 193 -200
  22. Osaci, M., *Optimization of the 3D simulation model of the magnetic relaxation time for a nano-particles system with dipolar interaction*, Metalurgia International, Vol. IX, 2004, nr. 5, pp. 3 – 9
  23. Osaci, M., Muscalagiu, I., *About behavior of the ferrite nano-particles in radio-frequency magnetic fields*, International Metallurgy Journal, Vol. IX, 2004, no. 5, pp. 18 – 21
  24. Osaci, M., Muscalagiu, I., *Behavior of the mixed NiZn ferrite magnetodielectric nano-composites in radio frequency magnetic fields*, International Metallurgy Journal, Vol. IX, 2004, no. 6, pp. 47 –50
  25. Osaci, M., Pănoiu, M., Muscalagiu I., *Comparative study about simulation models for ferrite nano-composites behavior in radio-frequency magnetic fields*, Romanian Journal of Physics, Vol. 49, no. 9-10, 2004, pp. 789-793
  26. Popa, I., Popa, G. N., *Sizing of the Branch Three-Phase Low Voltage Power Lines by Superposition Method*, 7<sup>th</sup> International Conference on Applied and Theoretical Electricity, ICATE 2004, Băile Herculane, 2004, pp. 325-328
  27. Popa, I., Popa, G. N., Tirian, O., *Sizing of the Branch Three-Phase Low Voltage Power Lines by Superposition Method*, Proceedings of the 4<sup>th</sup> National Conference with international participation -“Professor Dorin Pavel – founder of the Romanian Hydro-energetics”, Science and Engineering, Vol.V, Sebeș, 2004, pp. 133-138
  28. Popa, G.N., Popa, I., Abrudean, C., *Performance analysis of the electric-filters with industrial plates*, Proceedings of the 4<sup>th</sup> National Conference with international participation -“Professor Dorin Pavel – founder of the Romanian Hydro-energetics”, Science and Engineering, 2004, pp. 333-340
  29. Rusu, N., Hărău, C., Ilca, I., Anghel, S., *Avoiding strain on continous casting by correlation of the working rate*, International Metallurgy Journal, no. 5, 2004, ISSN 1582-2214, pp. 35-38
  30. Tirian, O., Pinca Bretotean C., *Contributions to the development of scientific research regarding to the hardness of rolls for rolling*

- mills, Scientific Conference, 9<sup>th</sup> edition, Tg-Jiu, 2004, ISBN 973-8436-99-0, Vol. I, pp. 75-80
31. Tirian, O., *Digital Control of Robot Gripper*, Scientific Conference, 9<sup>th</sup> edition, Tg-Jiu, 2004, ISBN 973-8436-99-0, Vol. I, pp. 371-374
  32. Josan, A., *Study about distribution of thermal field by finite element method*, International Conference on advanced materials and technology ROMAT, Bucharest, 2004, pp. 320-323
  33. Josan, A., Petre, D., Puțan, V., *Study concerning the determination of section hardness variation on hypereutectoid steel rolls, type OTA-3*, 10<sup>th</sup> International Symposium on experimental stress and analysis and material testing, vol. I., Sibiu, 2004, pp. 355-358
  34. Benea, M.C., Benea, M.L., *Lasting development in agricultural policy of the community*, Annals of the "Eftimie Murgu" University in Resita, 2004, pp. 79-81
  35. Benea, M.C., *Globalisation, universities and development*, 1<sup>st</sup> International Scientific Conference „Economy and Globalisation”, Tirgu Jiu, 2004, pp. 179-180
  36. Kiss, I., Hepuț, T., *Mechanical Properties of the Semi-hard Cast Iron Rolls provided by Basic Elements*, "MASINSTVO" – Journal of Mechanical Engineering, No.1, 2004, Zenica, Bosnia & Herzegovina, pp. 33-42
  37. Kiss, I., Maksay, St., *Triple Correlations between Semi-hard Cast Nodular Iron Rolls' Hardness and Main Alloyed Elements (Cr, Ni, Mo) Presented in the Matlab Area*, "MASINSTVO" – Journal of Mechanical Engineering, No.4, 2004, Zenica, Bosnia & Herzegovina, pp. 217-224
  38. Puțan, V., *Experimental and numerical research on parameters influencing the temperature of liquid steel stream during ladle descent*, Debates of the 4<sup>th</sup> National Conference under the name of «Prof. Dorin Pavel – founder of the Romanian hydro-energetics», Sebeș, 2004, Vol. VI, pp. 459-464
  39. Puțan, V., *Numerical studies on the parameters influencing steel stream temperature during teeming*, International Conference on Advanced Materials and Technologies – ROMAT 2004, Bucharest, 21–22 Oct., 2004, pp. 334-340
  40. Socalici, A., *Contributions regarding to the influence of micro-coolers over strength characteristics of carbon steel*, International Metallurgy Journal, no. 6, 2004, pp. 31-35
  41. Socalici, A., Ilca, I., Hepuț, T.- *Research about structure improvement of steel ingots*, VI<sup>th</sup> International Symposium of Young People and Multi-curricula Research, Romania – Serbia & Montenegro – Hungary, Timișoara, 2004, pp. 229-331
  42. Vilceanu, L., Babeu, *A numerical analysis by finite element method about the wire ropes life time calculation*, Annals of the Faculty of Engineering Hunedoara, 2004, Vol. II, Fasc. 1, pp. 127-130
  43. Vilceanu, L., Ghita, E., *Analytical study on state of stress for contact between steel rope's wires*, Annals of the Faculty of Engineering Hunedoara, 2004, Vol. II, Fasc. 1, pp. 131-136
  44. Rațiu, S., *Modern methods of temperature gauging inside the working area of flame-heated ovens*, International Metallurgy Journal, no.6, 2004, ISSN 1582-2214, pp. 43-46
  45. Rațiu, S., Abrudean, C., *Numerical simulation of transient, multidimensional heat conduction using the FDA method*, International Conference on Advanced Materials and Technology – ROMAT 2004, Bucharest, 21–22 Oct. 2004, pp. 328-333
  46. Bălan, D., Rațiu, S., Alexa, V., *Analytical solution of tri-dimensional thermal conduction in non-stationary state*, Debates of the 4<sup>th</sup> National Conference under the name of «Prof. Dorin Pavel – founder of the Romanian hydro-energetics, Sebeș, 2004, Vol VI, pp. 453-458

#### PhD THESIS

1. Diniș, C., *Research about simulation and management of the sintering plants' process*
2. Popa, G. N., *Contributions with respect to improvement of performances for the industrial electric-filters of double-phase gas-solid particles' systems*
3. Cioată, V. G., *Study and research regarding to metal and alloy stamping in semi-liquid status*
4. Lăpușan, A., *Contributions to the study of steel behavior under high temperature*
5. Ardelean, E. D., *Research about improvement of the deformation behavior of continuous casting semi-finished steel products*
6. Josan, A., *Study and research about increasing the endurance of rolls for rolling mills*
7. Rațiu, S. A., *Study about simulation of thermal fields at steel heating for plastic deformation*

8. Socalici, A. V., *Contributions with respect to quality improvement of the steel parts obtained from big ingots' forging*

#### PERSPECTIVES, INTERESTS, STRATEGIC PRIORITIES

- Theory of systems and automatic control
- Flexible lines and robotics
- Electrical-mechanical actuators and electric traction
- Magnetism, physics of the magnetic nanoparticles' systems, magnetic-dielectric materials
- Developing the research on the technology of obtaining continuous casting products
- Waste materials recycling
- Improving the quality of the plastically deformed products
- Environmental protection

#### RESEARCH TEAMS

##### 1. Thermal wear of the rolls for rolling mills. Endurance of the rolls for rolling mills

- Lect.dr.eng. Camelia Pinca Bretotean,
- Lect.dr.eng. Ana Josan
- Assist.eng. Imre Kiss
- Lect.dr.eng. Gabriela Mihuş
- Assist.eng. Cristina Miklos
- Lect.dr.eng. Sorin Raţiu
- Assist.eng. Ovidiu Tirian

##### 2. Improvement of performances for the industrial plate electric filters

- Lect.dr.eng. Gabriel Nicolae Popa
- Lect.dr.eng. Corina Daniela Cuntan
- Lect.dr.eng. Angela Iagar
- Lect.dr.eng. Corina Maria Dinis
- Assist.eng. Cristian Abrudean
- Assist.eng. Ovidiu Tirian

##### 3. Research to perform some performant protection and comutation devices for low voltage installations

- Lect.dr.eng. Caius Pănoiu
- Lect.dr.eng. Nicolae Rusu
- Lect.dr.eng. Manuela Pănoiu
- Lect.dr.eng. Sorin Deaconu
- Lect.dr.eng. Stela Anghel
- Assist.eng. Ioan Baci
- Assist.eng. Lucian Gherman
- Assist.eng. Cristina Miklos

##### 4. Principles, methods and technology for standardization of object oriented software systems; Research about simulation with agents; Concurrent and distributed approaches of the programming based on constraints

- Lect. Ionel Muscalăgiu

- Lect.dr.eng. Manuela Pănoiu
- Lect.dr. Mihaela Osaci
- Assist.eng. Anca Iordan
- Lect.eng. Adela Berdie
- Assist.eng. Daniela Cristea

##### 5. Increasing the life span of metallurgical equipment

- Lect.dr.eng. Teodor Vasiu
- Prof.dr. Ştefan Maksay
- Lect.dr.eng. Carmen Alic
- Lect.dr.eng. Imre Miklos
- Lect.dr.eng. Imre Zsolt Miklos
- Lect.dr.eng. Camelia Pinca Bretotean
- Lect.dr.eng. Vasile Alexa
- Assist.eng. Adina Budiul Berghian
- Assist.eng. Cristina Miklos

##### 6. Study on the mechanical characteristics of the steels on low temperatures

- Prof.dr.eng. Francisc Weber
- Lect.dr.eng. Carmen Alic
- Lect.dr.eng. Imre Miklos
- Lect. Dan Ludovic Lemle
- Assist.dr.eng. Amalia Dascăl
- Lect.dr.eng. Vasile Cioată
- Assist. Diana Bălan

##### 7. New technologies of producing composite materials and metallic powders

- Prof.dr.eng. Teodor Hepuţ
- Lect.dr.eng. Erika Ardelean
- Lect.dr.eng. Vasile Puţan
- Assist.eng. Imre Kiss

##### 8. Recycling ferrous and non-ferrous metallic wastes in the siderurgical industries and other branches

- Prof.dr.eng. Teodor Hepuţ
- Lect.dr.eng. Virginia Socalici
- Assist.eng. Adrian Găvănescu
- Lect.dr.eng. Vasile Puţan
- Assist.eng. Imre Kiss

##### 9. Environment protection in the metallurgic industry and other fields of pollution

- Prof.dr.eng. Teodor Hepuţ
- Assist.eng. Adrian Găvănescu
- Lect.dr.eng. Erika Ardelean
- Lect.dr.eng. Virginia Socalici
- Lect.eng. Marius Ardelean

#### CONTACT

Director of the Center:  
Lect.dr.eng. Teodor VASIU  
Revoluţiei Street, nr. 5  
331128, Hunedoara, Romania  
Tel. +40-254-207502 Fax. +40-254-207501  
E-mail: [dorin.vasiu@fih.utt.ro](mailto:dorin.vasiu@fih.utt.ro)

