

6<sup>th</sup> International Symposium  
of Croatian Metallurgical Society

***S H M D '2004.***

“Materials and Metallurgy”

<http://pubwww.srce.hr/metalurg>

Šibenik 2004, June 20 - 24  
Solaris Holiday Resort, Croatia

In the organization of Croatian Metallurgical Society the sixth International Symposium of on “Materials and Metallurgy” was held.

Here are some data on the 6<sup>th</sup> symposium of Croatia Metallurgical Society.

**6<sup>th</sup> International Symposium of Croatian Metallurgical Society “Materials and Metallurgy” was held as a part of:**

- 45<sup>th</sup> anniversary of the foundation of Croatian Metallurgical Society (from Society of Engineers and Technician Steel Works Sisak 1957 y.).

**At the 6<sup>th</sup> International Symposium of Croatian Metallurgical Society “Materials and Metallurgy” the following countries had participad:**

- |                           |                 |                           |
|---------------------------|-----------------|---------------------------|
| 1. Austria                | 13. Egypt       | 25. Romania               |
| 2. Australia              | 14. France      | 26. Russia                |
| 3. Belgium                | 15. Germany     | 27. Serbia and Montenegro |
| 4. Beloruss               | 16. Greece      | 28. Slovakia              |
| 5. Bosnia and Herzegovina | 17. Hungary     | 29. Slovenia              |
| 6. Brasil                 | 18. Italy       | 30. South Africa          |
| 7. Bulgaria               | 19. Japan       | 31. Spain                 |
| 8. Canada                 | 20. Korea       | 32. Sweden                |
| 9. China                  | 21. Netherlands | 33. Turkey                |
| 10. Croatia               | 22. Norway      | 34. Ukraine               |
| 11. Czech Republic        | 23. Poland      | 35. USA                   |
| 12. England               | 24. Portugal    |                           |

**The aim of this Symposium was to point out  
all the possibilities of the materials and achievements in metallurgy.**

**ORGANIZER**

CROATIAN METALLURGICAL SOCIETY (CMS)

**HOST**

- Vatrostalna Sisak d. d.

**PATRONS**

- European Steel Federation
- International Iron and Steel Institute
- Ministry of Science, Education and Sport Republic of Croatia,
- Croatian Chamber of Economy

**CO-ORGANIZERS**

- Academy of Engineering Science of Ukraine
- University of Mining and Metallurgy, Faculty of Foundry Engineering, Krakow
- University of Ljubljana, Faculty of Natural Science and Engineering
- Mechel-Željezara d.o.o. Sisak, Croatia
- University of Sarajevo, Faculty for Metallurgy and Materials Science, Zenica
- National Metallurgical Academy of Ukraine
- Technical University of Košice, Faculty of Metallurgy
- Technical University of Košice, Faculty of Mechanical Engineering
- Technical University of Košice, Berg Faculty
- University of Zagreb, Faculty of Mechanical Engineering and Naval Architecture
- University of Osijek, Faculty of Mechanical Engineering, Slavonski Brod
- University of Rijeka, Technical Faculty
- VŠB Technical University of Ostrava
- University of Split, Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture
- Institute of Metals and Technology, Ljubljana
- Institute of Materials Research of the Slovak Academy of Sciences in Košice
- Steel Works Split
- Moscow State Steel and Alloys Institute
- Physico-Technical Institute National Academie of Science Minsk
- Politehnica University of Bucharest
- Institute of Metallurgy “Kemal Kapetanović”, Zenica
- Pisarenko Institute of Problems of Strength NASU, Kiev
- Dnepropetrovsk National University
- Iron Metallurgy, Prague
- Slovak University of Technology in Bratislava, Faculty of Materials Science and Technology

**CO-OPERATION WITH ORGANIZATIONS**

- German Iron and Steel Institute (VDEh)
- ATS - Association Technique de la Siderurgie Francaise

- CENIM - Centro National de Investigaciones Metalurgicas Spain
- ChSM - The Chinese Society for Metals China
- CRM - Centre de Recherches Metallurgiques Belgium
- Eisenhütte Österreich - The Austrian Society for Metallurgy
- Iron and Steel Society, USA
- ISIJ - The Iron and Steel Institute of Japan
- JERN - Jernkontoret, Sweden
- SRM Romanian Society for Metallurgy
- SITPH - Association of Polish Metallurgical Engineers
- HOOGOVENS The Netherlands
- SHS - Slovak Metallurgical Society
- Sociedade Portuguesa de Materiais
- MVAE - Association of Hungarian Steel Industry
- Steel Federation of the Czech Republic
- Union of Bulgarian Metallurgists
- IBS - Instituto Brasileiro de Siderurgia
- AIM - Associazione Italiana di Metallurgia
- The Japan Institute of Metals

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**TOPICS OF THE SYMPOSIUM WERE:**

**Materials**

- New Materials
- Refractory Materials
- The Development
- Applications
- Physical Metallurgy

**Metallurgy**

- Process Metallurgy and Foundry
- Plastic Processing of Metals and Alloys
- Technologies
- Energetics
- Ecology in Metallurgy
- Quality Assurance and Quality Management

There were 368 reports from 28 countries, 660 authors and coauthors registered for the sixth International Symposium of the Croatian Metallurgical Society.

250 participants from 23 countries were present at the symposium. Symposium activity took place through plenary lectures and four sections (poster):

Plenary lectures.....	12
Materials - Section "A".....	111
Process Metallurgy - Section "B".....	104
Plastic Processing - Section "C".....	78
Metallurgy and Related Topics - Section "D".....	63

For the plenary lectures research topics were selected relating partly to the materials and partly to the increase of efficiency of metallurgical procedures, decrease of required energy as well as improving of products quality.

**PLENARY LECTURES WERE:**

**H. Hiebler, J. F. Plaul;** *Institute for Metallurgy, Montan University, Leoben, Austria*

**Hydrogen Plasma Smelting Reduction - an Option for Steelmaking in the Future**

**M. Gojić;** *Faculty of Metallurgy, University of Zagreb, Sisak, Croatia*

**Current State and Development of Steelmaking Processes**

**R. Kawalla, W. Lehnert;** *Institut für Metallformung, TU Bergakademie Freiberg, BRD*

**Qualität Durch Umformung**

**F. Vodopivec;** *Institute of Metals and Technology, Ljubljana, Slovenia*

**Strain Ageing of Structural Steels**

**E. V. Pereloma, I. B. Timokhina, A. I. Nosenkov, J. J. Jonas\*;** *School of Physics and Materials Engineering,*

*Monash University, Australia, \*Department of Metallurgical Engineering, McGill University, Montreal, Canada*

**Role of Cr and P**

**Additions in the Development of Microstructure and Texture in Annealed Low Carbon Steels**

**E. Mihok;** *Faculty of Metallurgy, Technical University of Košice, Košice, Slovakia*

**Quality Management**

**Systems - New Approach by ISO 9000 / 2000**

**V. M. Drujan, I. Mamuzić\*;** *National Metallurgical Academic of Ukraine, Dnepropetrovsk, Ukraine, \*Faculty of Metallurgy, University of Zagreb, Sisak, Croatia*

**Techno-Economic**

**Indicators of Seamless Tube Production**

**V. A. Grynkevych, I. Mamuzić\*, V. M. Danchenko;** *National Metallurgical Academy of Ukraine, Dnepropetrovsk, Ukraine, \*Faculty of Metallurgy, University of Zagreb, Sisak, Croatia*

**On Development of Methods of**

**Computer Simulation for Processes of Metal Forming**

Comprehensive outline of plenary reports (the first 8 reports) were published in the journal *Metalurgija* 43 (2004) 3, 143-198 as the article and the summaries of all lectures in the same volume, 201-263.

Review of the lectures of Poster section were also published in the Journal *Metalurgija* 43 (2004) 3:

- Review of the lectures of materials - section "A", *Metalurgija* 43 (2004) 3, 203-205;
- Review of the lectures in process metallurgy - section "B", *Metalurgija* 43 (2004) 3, 223-225;
- Review of the lectures of plastic processing - section "C", *Metalurgija* 43 (2004) 3, 241-243;
- Review of the lectures of metallurgy and related topics - section "D", *Metalurgija* 43 (2004) 3, 255-256.

For this symposium the reports were prepared by the authors and coauthors from various world universities, institutes, academies and companies. It is to be emphasised that the scientists from all four Croatian universities (Zagreb, Rijeka, Osijek, Split) participated in the symposium. However, a less number of company experts engaged directly in the domestic and foreign manufacturing practice was noticed.

- In the time of 6<sup>th</sup> Symposium was also held:
  - meeting of International Editorial Board of the journal *Metalurgija*;
  - for the Editor - in - chief is elected Acad. D. Sc. I. Mamuzić in the period 2004-2008.

More than 100 participants were included in a round table session on the achievements, conclusions and clos-

ing of the 6<sup>th</sup> International symposium “Materials and Metallurgy” was held.

In the discussions it was confirmed that the symposiums organized by Croatian Metallurgical Society have become traditional assembly of experts and scientists of various profiles: metallurgists, geologists, physicists, chemists, mechanical engineers etc.

With a demonstration of their best achievements they all assist the metallurgy in Croatia to call the same attention as it does otherwise in the world.

Subsequently we give some of the discussions on the 6<sup>th</sup> Symposium following sections:

#### **F. Vodopivec: *Materials* - Section “A”**

The contributions cover mostly conventional research and development (RD) topics with a great number of them related to research and development (RD) of steels. In a limited number of contributions, mostly from ukrainian authors, findings on RD of niobium, molybdenum, titanium, tungsten and dental alloys are presented.

The number of contributions and authors from industrial companies is small. Looking from slovenian experience, this probably does not indicate that little RD is performed in companies. In every country participating to this conference, a number of companies market a significant share of production on competitive markets also with a significant share of high technology products. The small interest for active participations from industry to an international conference indicates probably that managers do not realize that a good contributions is also good publicity for the company, if not for the great number of contributions and authors, positively because of the presence of the great number of countries. Also the fact that participants may come to new RD ideas listening to presentations, participating to the discussions and in personal contacts with other participants should not be neglected in companies wanting to follow the RD activity of their potential market competitors.

Based on the contents the summaries submitted the 111 contributions were classed in 14 groups with the aim to have a rapid general information on topics of major RD interest in countries of origine of authors and coauthors. In a great number of summaries more place is given to goals than to the results of the investigation. For this reason, the inclusion of a number of contribution in a specific group may be erroneous considering the actual research findings which will be, eventually, presented at the conference. It is hoped that the misplacing of a contributions f.i between the group Physical Metallurgy and Methodology could not change significantly the overall impression on the RD goals and the results achieved and presented.

These 14 groups are:

- processing of steel;
- powder metallurgy;
- physical metallurgy;
- mechanical properties and testing;
- corrosion and corrosion protection;
- surface technology and wear;
- computer modelling;
- composites;
- methodology;
- light alloys;
- non ferrous and non light alloys;
- welding;
- non metallic and refractory materials;
- miscellaneous.

#### **E. Mihok: *Process Metallurgy* - Section “B”**

104 papers were included into the section. According to their scope they were subdivided into twelve groups:

- coke production;
- sintering of fine materials;
- pig iron production;
- production of ferroalloys;
- steel production;
- refractories;
- foundry metallurgy;
- non - ferrous metals;
- environment protection;
- general problems of metallurgy;
- inorganic materials;
- miscellaneous.

In same cases it was difficult to include the contribution into specific group as it contained information related to more fields.

The Symposium presented many new information both to scientists and factory staff members and we hope that this high level will be kept in the future. Our thanks are directed to organizers.

#### **P. Fajfar: *Plastic processing* - Section “C”**

78 contributions have been received for Section C on Plastic processing of materials. According to their scope they were subdivided into 11 groups:

- plastic deformation;
- tool wear;
- drawing;
- tubes;
- plate and shape rolling;
- extrusion;
- forging;
- sheet metal forming;
- modernization and optimisation;

- history survey;
- miscellaneous.

The most numerous are the contributions of the scientists from Croatia (27), Poland and Ukraine (14), Slovenia (13), Russia and Slovakia (7), Bosnia and Herzegovina (4), Czech Republic (4), Germany (4) and Austria (3) and s. o. Survey of the authors shows that nearly one fourth of the contributions are the result of cooperation between research institutes from different countries. Most contributions have been sent by research institutions (59), 13 of them are the result of cooperation between research institutions and industry and only 5 of them have been written by authors who work only in industry.

The variety topics and different ways of the solutions of problems treated in papers presented is a confirmation of vitality of metallurgical science in Europe and in Croatia. From this point of view the organizer of 6<sup>th</sup> International Symposium of Croatian Metallurgical Society may be satisfied.

#### **P. Fajfar: *Metallurgy and Related Topics* - Section "D"**

63 contributions have been received for Section D on Metallurgy and related topics. The most numerous are the contributions of the scientists from Slovakia (40), Poland (9), Ukraine (6), Russia (4), Czech Republic, Croatia (3) and s. o.

Only three contributions result from cooperation between research institutes from different countries (SK and CZ).

Topics of section D are:

- mineral engineering;
- renewable energy;
- environment pollution;

- marketing in metallurgical and mining enterprises;
- materials;
- other applications.

Although the papers presented in the section "Metallurgy and related topics" are very heterogeneous according to scientific discipline, quality and subject matter of most of the papers justify their including into the program of the symposium. Their usefulness for the branch of metallurgy can be seen in the possibility of comparison in methods and techniques used in applied research and resolving certain professional problems. First, this refers to mineral dressing and other disciplines that it leans on. Secondly, this refers to computer application for resolving technological problems. Thus, it can be concluded that including papers from other disciplines adjacent to metallurgy and wider into the program of the symposium is useful and stimulating in interdisciplinary terms for future.

Based on the analysis and evaluation of the subject matter of the symposium, the symposium has been appraised positively and it has been acknowledged that it has its place in the international exchange of knowledge.

It is reasonable to conclude that the demonstrated results of scientific and professional investigation accompanied by the complete and quality manifestations, especially discussions at the round table prove that the organizing of the sixth International symposium of Croatian Metallurgical Society "Materials and Metallurgy" in Šibenik 2004, June 20 - 24 was justified. Especially has to be emphasized that the participants will keep wonderful memories of Šibenik and Solaris Hotels.

Based on the conclusion of the round table the 7<sup>th</sup> International symposium of Croatian Metallurgical Society "Materials and Metallurgy" will be held 2006 - June 18 - 22. Solaris Holiday Resort, Šibenik, Croatia.