



Photo essay

- 7. Memories of CAM<sup>3</sup>S'2006 Conference, 27<sup>th</sup>-30<sup>th</sup> November 2006 in Gliwice-Zakopane, Poland  
The Organising Committee of the CAM<sup>3</sup>S'2006 Conference
- 11. Recollection of Prof. J. Adamczyk  
L.A. Dobrzański (Poland)



Research paper

- 13. Heat treatment and mechanical properties of low-carbon steel with dual-phase microstructure  
J. Adamczyk, A. Grajcar (Poland)



Materials

- 21. Repair of magnesium alloy castings by means of welding and pad welding  
J. Adamiec, S. Roskosz, R. Jarosz (Poland)
- 25. Properties of cast iron modifying with use of new inoculants  
J. Jezierski, D. Bartocha (Poland)
- 29. Corrosion resistance of Elektron 21 magnesium alloy  
A. Kiełbus (Poland)
- 33. The influence of HEBM on the structure of Fe-0,8%<sub>C</sub> alloys  
R. Nowosielski, W. Pilarczyk (Poland)



Properties

- 37. Crack initiation and propagation in FeAl matrix  
D. Renowicz, S.J. Skrzypek (Poland)
- 41. Crack growth resistance of Al<sub>2</sub>O<sub>3</sub>-ZrO<sub>2(nano)</sub> (12 mol% CeO<sub>2</sub>) ceramics  
M. Szutkowska, M. Boniecki (Poland)



Methodology of research

- 45. Barium ferrite powders prepared by milling and annealing  
R. Nowosielski, R. Babilas, G. Dercz, L. Pająk, J. Wrona (Poland)



Analysis and modelling

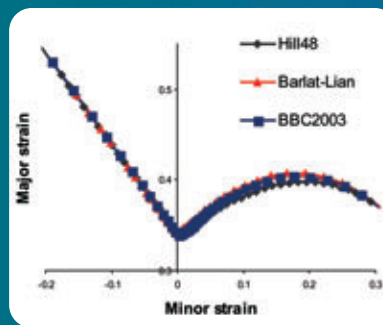
- 49. Analysis of a degenerated standard model in the piercing process  
K. Jamroziak (Poland)

Selected materialographical photo



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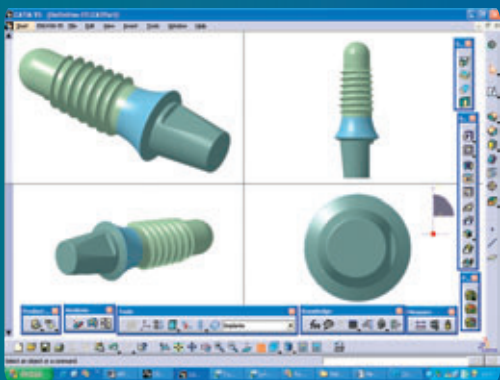
In the last research paper of Professor Jan Adamczyk from the Institute of Engineering Materials and Biomaterials, the Silesian University of Technology, Gliwice, Poland entitled "Heat treatment and mechanical properties of low-carbon steel with dual-phase microstructure" written together with A. Grajcar on a page 13 microscopy methods were used to investigate the influence of heat treatment parameters on the structure light and transmission electron. The aim of the paper is to design heat treatment conditions of dual-phase steel and to determine their influence on the structure and mechanical properties of steel. Investigations concerning using the thermomechanical treatment to obtain a ferritic – martensitic structure of steel are required. It was found out that an initial structure influences essentially the morphology of martensite in an obtained dual-phase structure. It can occur as a network, fine fibres or islands in a ferritic matrix of high dislocation density in the vicinity of diffusionless transformation products of austenite. The best combination of strength and ductile properties has steel with martensite in a form of fine fibres. The established heat treatment conditions can be useful for manufacturing dual-phase structure sheets characterised by high strength and ductile properties as well as good suitability for metal forming operations.



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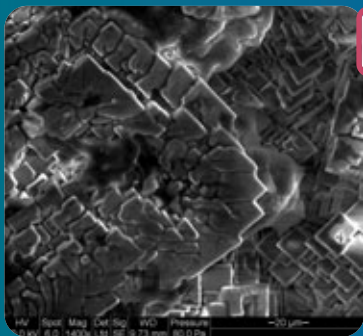
The paper from analysis and modelling area made by J. Majak, M. Pohlak and R. Küttner on "A simple algorithm for formability analysis" on a page 57 shows a simple algorithm for local and diffuse necking analysis, which covers different

yield criteria and strain hardening laws. The study is based on classical instability conditions. The stress-strain behaviour of the material is described with empirical equation (the strain rate and also temperature dependence of the flow stress are not considered). The forming limit curve determined defines boundary between elastic or stable plastic deformation (below curve) and unsafe flow (above curve). The risk of failure is determined by the distance between the actual strain condition in the forming process and the forming limit curve. A simple algorithm for local and diffuse necking analysis is proposed. The dimensionless instability tensors introduced can be used for theoretical improvements.



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The paper entitled "A new approach to modelling and designing mono-block dental implants" presented by R. Hunter, F. Alister, J. Möller and J. Alister on a **page 77** shows a new approach to modelling and design of the low cost mono-block dental implants based on the integration of the computer aided techniques. This approach provides the automation of the design process of the mono-block dental implants. The findings are focused on two main topics. The first one is the minimisation of manufacturing cost and time based on the manufacture process automation. The second one is the integration, in the same informatics platform, of the design, analysis and manufacturing environment. The main outcomes and implications of this research is the design of a low cost dental implant. This solution is implemented to assist the social programmes of oral health. The implications are focused on the development of a new design of mono-block dental implants. One of the main features of this design is associated to the reduction of the surgical stage and their simplification respect to other commercial implants. The originality of this research is the design of a new model of mono-block dental implant. The structure of this implant improves mechanical properties; reduce manufacturing cost and surgical complications.



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The manufacturing and processing area section represented by M.J. Jackson and G.M. Robinson on "Development of Morphology in Laser Dressed Grinding Wheels" on a **page 81** presents the development of faceted

morphology in laser dressed grinding wheels. The approach used in the paper is based on locally melting a vitrified grinding wheel and measuring features such as grain size, cooling rate and melt depth as a function of laser fluence and relating these measures to the morphology shown in the microstructures presented in the paper. The results imply that laser dressed grinding wheels can be used for machining different materials at different grinding speeds. The paper also shows that much development is needed to identify laser processing conditions that are appropriate for different workpiece materials. The findings show that further research is required to fully understand how certain morphologies form as a function of cooling rate and laser fluence. It should be noted that morphologies observed in laser processed grinding wheels include cellular and fully dendritic morphologies in addition to faceted vertices. The originality in the paper is focused on the formation on minute cutting points using increasing laser fluences.

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B. Mochnecki, R. Szopa (Poland)
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T. Smolnicki, E. Rusiński, J. Karliński (Poland)



## Manufacturing and processing

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85. Analysis of quality of sowing by pneumatic sowing machines for sugar beet  
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## Education and research trends

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