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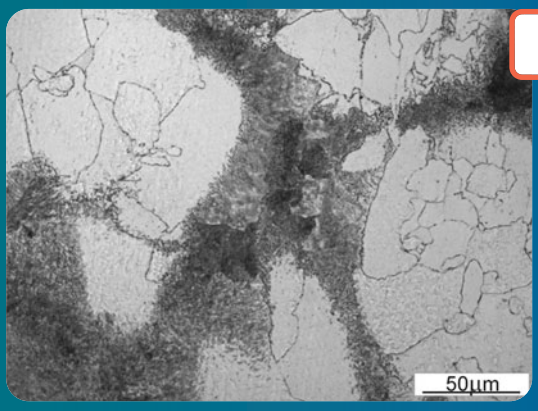
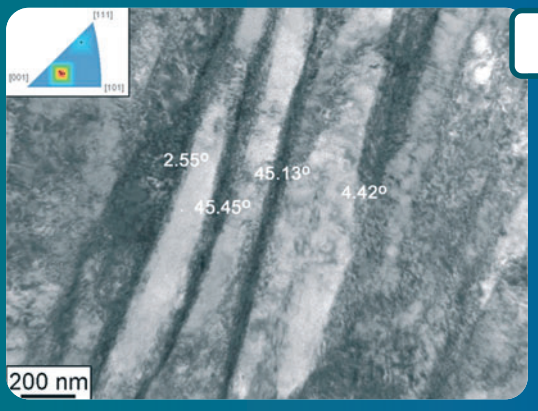
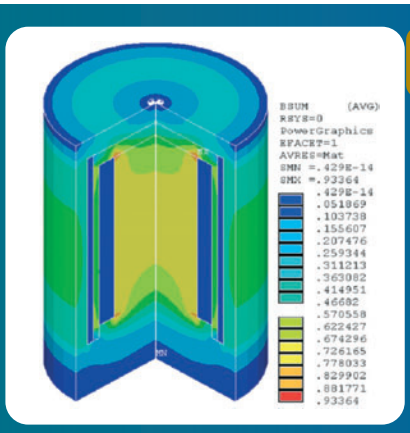
Selected materialographical photo



The paper entitled "The microstructure and properties of the bainitic cast steel for scissors crossovers" by J. Pacyna, P. Bała, S. Dobosz, A. Kokosza and S. Kąc on a **page 19** shows the description of microstructure and properties of the new low-carbon Mn – Cr – Mo – V – Ni bainitic cast steel developed in the AGH Laboratory of Phase Transformations for cast mono-blocks of scissors crossovers. Investigations comprise material in as-cast state and after various variants of normalisation as well as normalisation and high tempering. The investigations were performed in order to estimate a possibility of applying bainitic cast steels for production of scissors crossovers in the form of monolithic blocks. Analyses of microstructure, strength properties, impact toughness and crack resistance (K_{Ic}) were performed both for material in the as-cast state and after heat treatment. The influence of the initial microstructure on the investigated cast steel hardness – after the normalising and after the normalising and tempering – was determined.



The paper from Properties area made by B. Leszczyńska-Madej and M. Richert on "Microstructure and properties of dynamically compressed copper Cu99.99" on a **page 35** describes the influence of dynamic compression on the possibility of microstructure refinement in polycrystalline copper Cu99.99. The results contribute to evaluation properties of the polycrystalline copper in the light of achievement of fine – grained microstructure. The obtained results indicated that dynamic compression with high strain rate can be an effective method for microstructure refinement, comparable with SPD methods. It was found out that to produce materials with nanometric features is not only possible by exertion of severe plastic deformation methods (SPD) but also by deformation with moderate strains and high strain rates. The demonstrated data show that in some range the amount of deformation and strain rate can be interchangeable parameters causing similar structural effects. The results may be utilized for determination of a relation between microstructure and properties of the copper in the process of dynamic compression.



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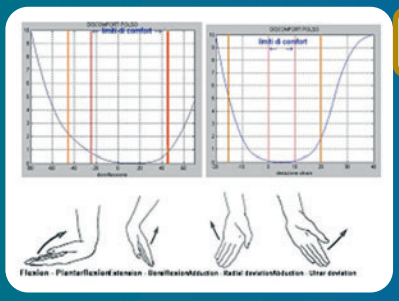
The paper written by V S. Kciuk, R. Turczyn and M. Kciuk on "Experimental and numerical studies of MR damper with prototype magnetorheological fluid" on a **page 52** discusses experimental studies of a prototype magnetorheological damper at various magnitudes of control current as well as the manner of modelling electromagnetic phenomena occurring in the damper. Model MR fluid was prepared using silicone oil OKS 1050 mixed with carbonyl iron powder CI. Furthermore, to reduce sedimentation, as stabilizers was added Aerosil 200. The observations of the surface morphology of carbonyl iron and fumed silica were carried out using Digital Scanning Electron Microscope SUPRA™25 ZEISS. The effect of magnetic field on magnetorheological fluid is modelled by the finite element method. The actual-non-linear characteristics of magnetisation identified experimentally were used as the values of relative magnetic permeability of the piston housing material. The possibility of application, e.g. real characteristics of material magnetisation and faster and faster calculation machines make possibility the creation of more precise models and more adequate ones to the reality. The presented model meets the initial criteria, which gives ground to the assumption about its usability for determining the dynamics properties of mechanical systems, employing the finite element method using ANSYS software.



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In the paper entitled "Postural Analysis in HMI design: an extension of OCRA standard to evaluate discomfort level" by A. Naddeo, C. D'Oria, N. Cappetti and M. Pappalardo on a **page 60** the developing a design methodology for preventive ergonomics and comfort analyses of Human-Machine-Interface (HMI) were determined. The method is based on the simulation of the main posture that a digital human model (a manikin representing, for example, a car's driver) takes while using a machine (in this work, driving a car), in order to judge human safety and comfort during interaction with dashboard, instruments' panel, levers and other commands. The ergonomic analyses are made using an appropriately modified OCRA (Occupational Repetitive Actions Index) protocol, in order to evaluate different involvement degrees of upper limb segments in the comfort action range. The first paper concerning this subject matter has been presented by one of the authors in 2008 in a World Automotive Congress. All over the world, a new research frontier, on these topics, is going towards HMI evaluation under physical comfort and cognitive ergonomics point of view. The paper represents, today, the newest and more specific development method, especially in automotive field of research. Using this approach and methods, comfort analysis can be made in the earliest part of the design development of a product so that designers can appreciably reduce time to the market and improve and innovate comfort performances.

Manufacturing and processing

Industrial management and organisation