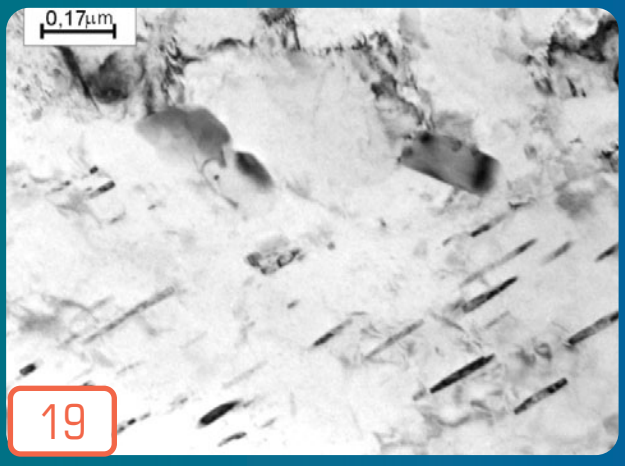
Photo essay

General review

Materials

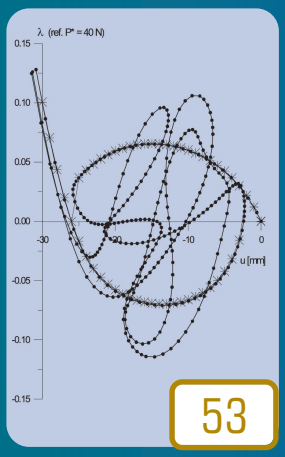
Properties

Selected materialographical photo



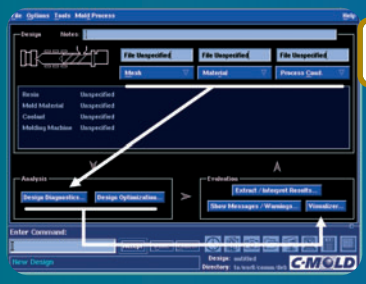
The paper entitled "The kinetics of phase transformations during the tempering of HS18-0-1 high–speed steel" presented by P. Bała, J. Pacyna and J. Krawczyk on a **page 19** shows the microstructure of the HS18-0-1 high speed steel after hardening from 1260°C and heating with the rate 0,05°C/s up to 790°C (TEM). These are the characteristic temperatures at which the end of precipitation of carbides of M_2C type is observed. During heating up to 790°C the morphology of primary carbides is not changed. Heating to 790°C caused the transformation of martensite into ferrite and precipitation of carbides which can be seen well on a TEM microphotograph. The carbides revealed on the microphotograph of the tested steel after such tempering, observed in TEM, are of M_2C type.

The research paper entitled "Phases created during diffusion bonding of aluminium and aluminium bronze chips" by J. Gronostajski, W. Chmura and Z. Gronostajski on a **page 32** describes an original concept of producing a composite, consisting in the mixing and the bonding of aluminium chips with aluminium bronze chips through press moulding and extrusion. As a result of the reciprocal diffusion of copper and aluminium during extrusion and heat treatment applied just after extrusion a creation of hard phases leading to an increase of wear resistant takes place. Diffusion bonding process of aluminium and aluminium bronze chips leads to creation of phases typical for Cu-Al alloys. The bonding takes place during extrusion of cold compacted mixture of aluminium and aluminium bronze chips and during heat treatment applied after extrusion. In this way, without the participation of metallurgical processes good bearing materials can be manufactured. The proposed new sintering criterion allows to determine the condition of sintering and deformation in order to obtain a good product.



The purpose of the paper on "Numerical solution techniques for structural instability problems" by E. Armentani, C. Cali, G. Cricrì, F. Caputoand R. Esposito on a **page 53** is to overcome numerical problems arising in structural instability numerical computations for equilibrium configurations corresponding to increasing loads on structures having points of instability or more generally large non linearity. The used numerical methodology was the finite element method with the particular technique of non linear transient dynamic analysis. In such a way dynamic equilibrium paths, which are able to lead to required corresponding static ones, can be obtained. A methodology to develop this kind of analyses as well as a procedure to set some initial parameters and to check the accuracy of the solution have been investigated and pointed out. In the future it will be possible to apply the investigated numerical procedure to other practical cases.

Authors: B. Mursec and F. Cus in the paper "Use of electronic catalogs for planning of machining processes" on a **page 65** present the electronic catalogues for selection of tools and cutting conditions, their advantages and disadvantages. Electronic catalogues of tools contain the data on the tools of different makers and the further development is so oriented that the tool user will obtain all the necessary information through the Internet. The OPTIS expert system serves for the optimisation of cutting conditions with respect to the minimisation of the manufacturing costs by taking into account the cutting process limitations. The Internet can be efficiently used in modernly organised computer-supported system for tool management. By means of the Internet it is possible to follow up particularly the products and novelties of the individual tool makers and to become familiarised with their ranges of products sold.



Analysis and modelling is shown in the paper on "Model optimization for mould filling analysis with application CAE package C-Mold" by J. Nabialek and J. Koszkul on a **page 75**. The aim of the research was to determine the sources of the lack of accuracy in numerical simulations of plastic flow during the injection moulding. The tensile test specimen has been used as a model. The experimental verification of numerical simulations of different FEM models reflecting different injection conditions has been performed. The results of the numerical simulations depend mostly on input data accuracy. Accuracy means here the knowledge of detailed description of the real materials with use of FEM model as well as the material and process parameters. In order to eliminate an error of the simulation the region between the end of nozzle and the last thermocouple in barrel was modelled as a part of a runner. A point at the level of thermocouple was assumed to be the plastic entrance point. This "additional" part of runner was modelled both as a cold and hot runner.

Analysis and modelling

Manufacturing and processing

Industrial management and organisation

Indexes