



Research paper

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 W. Bouzid (Tunisia), S. Torbaty (France)
15. Description of the deformation process under thermo-mechanical fatigue
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29. Structural characteristics of nickel super alloy INCONEL 713LC after heat treatment
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Methodology of research

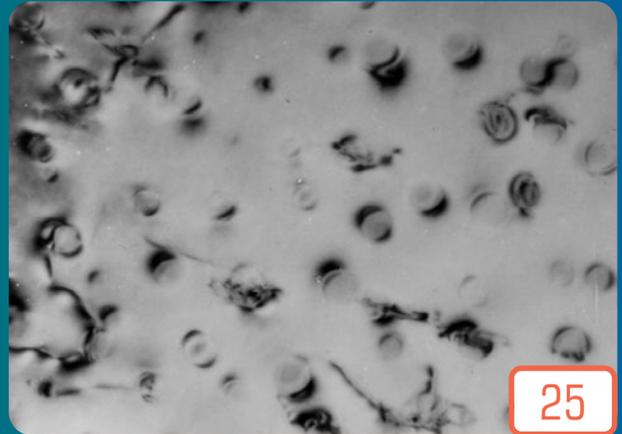
53. Analysis of influence of chemical composition of Al-Si-Cu casting alloy on formation of casting defects
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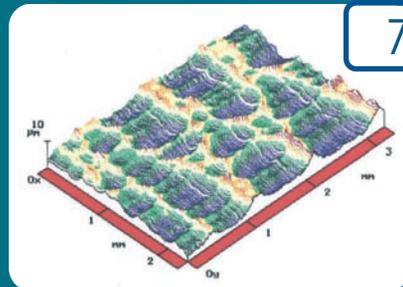
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57. Determination of machining parameters in HSM through TSK-FLC
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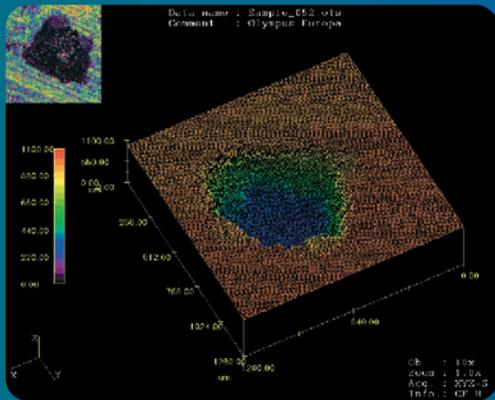
Selected materialographical photo



The paper entitled "Analysis of the structure and precipitation strengthening in a creep resisting Fe-Ni alloy" presented by K.J. Ducki on a **page 25** shows the relationships between the kinetics of precipitation and growth of the intermetallic phase γ' [$\text{Ni}_3(\text{Al,Ti})$] and the strengthening magnitude obtained in high-temperature Fe-Ni alloy of the A-286 type. In order to accomplish the goal of the study, the author used the LSW coagulation theory and Brown and Ham's conventional analysis of strengthening by ordered particles. The obtained relationships of the growth of the γ' phase particles as a function of temperature and aging time can be used to determine the magnitude of strengthening and flow stress in high-temperature Fe-Ni alloys during extended aging or usage. This study exploits LSW coagulation theory and Brown and Ham's conventional analysis to describe precipitation strengthening by ordered particles of the intermetallic phase γ' in high temperature Fe-Ni alloy.

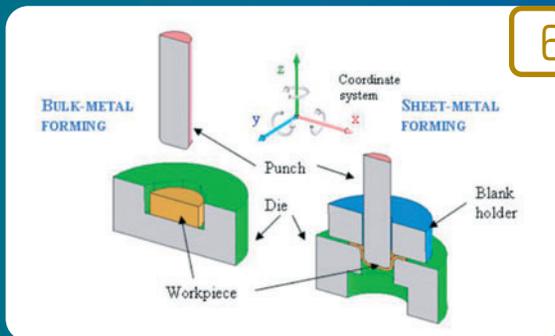


In the research paper entitled "Variation cutting speed on the five axis milling" elaborate by M. Boujelbene, A. Moisan, W. Bouzid and S. Torbaty on a **page 7** the study of the effective cutting speed variation in milling with a ball end tool is described. The methodology determines cutting speed of each mode of tilt tool in five axes machining, and proves a series of configurations and parameters combinations: cutting speed V_c , feed rate V_f , and tilt tool in multi-axis milling. This paper has investigated the effect of the tool orientation on the variation effective cutting speed, on the surface texture, while multi-axis milling. Experimental results have shown that disadvantages of three axes machining results from the existence of very low cutting speeds, even null when the tool axis is normal to the machined surface. This mode of machining generates a bad surface quality. Surfaces have a poor topography and important anisotropy. A suitable slope of the cutting tool by the means of the fifth machine tool axis, improves considerably work piece machined surface quality; good micro-geometrical surface topography and lower surface roughness. The relationship found between the effective cutting speed and surface texture work piece has an important practical implication since it allows for selecting the best cutting condition combination from the points of view both of the security and the economy for the established requirements in each case. Results are of great importance for aerospace and automotive industry.



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In the research paper entitled "Analysis of influence of chemical composition of Al-Si-Cu casting alloy on formation of casting defects" by L.A. Dobrzański, M. Krupiński, P. Zarychta and R. Maniara on a **page 53** a methodology of the computer-aided determining a relationship between chemical composition of aluminum alloy and castings quality has been presented. To resolve the problem artificial neural networks were used. Classification problems were evaluated by the consideration mainly of the values of mistakes and correct answers of networks for test data. On the basis of data analysed by the neural network, which has the best quality classification of chemical composition of tested material, the concentration of alloying elements range, which have an effect on formation casting defects, were developed to eliminate them in the future. The presented issues may be used, among others, for manufacturers of car sub-assemblies from light alloys, where meeting the stringent quality requirements ensures the demanded service life of the manufactured products.



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The analysis and modelling area section represented by W. Presz and B. Andersen on "Flexible tooling for vibration-assisted microforming" on a **page 61** presents that miniaturisation generates necessity of micro-parts production. Micro-scale means closer tolerances and better surface roughness. These requirements can be achieved with metal forming processes but under high pressure and sufficient relative sliding distance between tool and workpiece surface. It makes such a process proven to galling. This tendency increases with diminishing of component dimensions. It means that retarding undesirable surface phenomena with a special regard to galling becomes a critical factor for microforming. The method based on static and dynamic analytical and FEM calculations of proper design of vibration assisted flexible tooling with piezo-vibrators has been found. Proposed reference of micro-components and designed system can be used for investigations of technological parameters for utilisations of microforming. Flexible laboratory system is designed to manufacture a wide range of micro-components using tools vibrations for improving quality of products. After laboratory investigations it is attended to design industrial system working on the same principles.

61. Flexible tooling for vibration-assisted microforming
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