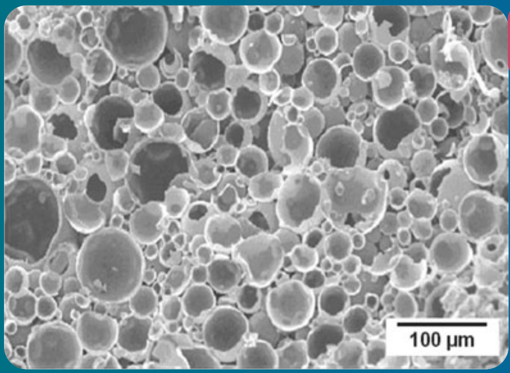
Materials

Methodology of research

Analysis and modelling

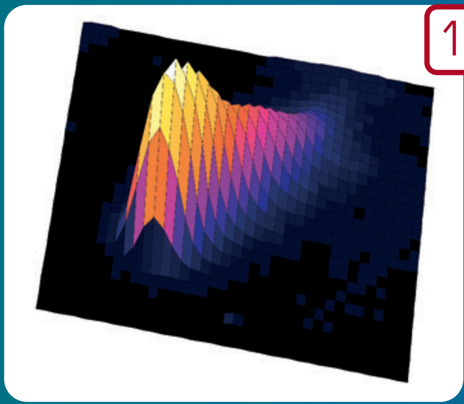
Manufacturing and processing

Selected materialographical photo



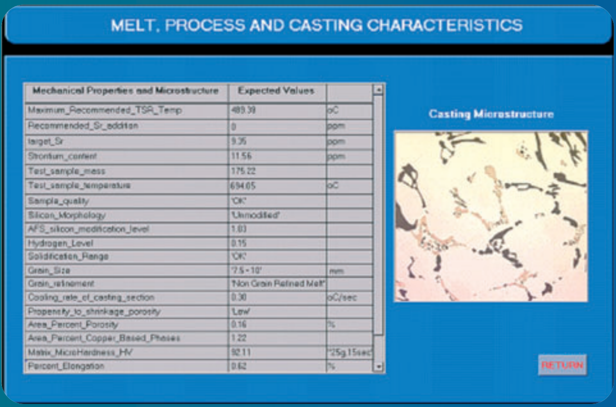
180

The research paper made by M.H. Robert, A.F. Jorge, F. Gatamorta and R.R. Silva on "Thixoinfiltration: a new approach to produce cellular and other low density metallic materials" on a **page 180** describes an innovative approach for the production of cellular metallic materials as well as low density metal matrix composites, by using thixoforming techniques; thixotropic semisolid metal is infiltrated into removable and non-removable space holder preforms. Different kinds of preforms are tested to obtain open cell material (sponges), syntactic foams and low density composites. Products are evaluated concerning relative density and mechanical behaviour under compressive stresses. Results show that thixoinfiltration is a simple and low cost technique to produce different types of low density, porous material. Open cell material as well as syntactic foams and low density composites can be produced with reliable internal quality and dispersion of cells and reinforcement. Composites containing porous reinforcements can present some mechanical characteristics of the conventional cellular metals. Infiltration of appropriate preforms by thixotropic metallic alloys to produce low density composites and cellular material is a new technique under development by the proposing group at FEM/UNICAMP.

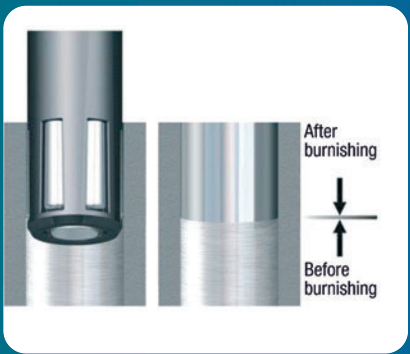


131

The paper entitled "Application of thermovision method to welding thermal cycle analysis" by J. Nowacki and A. Wypych on a **page 131** demonstrates the possibility of of thermovision method application in the thermal cycle of Inconel 625 on 13CrMo4-5 steel pad welding thermal cycle analysis. Single- and multibead pad welding of steel 13CrMo4-5 by superalloy Inconel 625 has been carried out by means of GMA method in inert gas backing shielding, in horizontal position and 620 J/mm and 2100 J/mm heat input level. Quantitative data concerning infrared radiation emission as a basis for evaluation of thermal history of the applied object in order to assist interpretation changes occurring in padding welds and heat-affected have been obtained on the grounds of infrared radiation measurement by means of Flir Systems ThermaCAM SC2000 PAL infrared camera. The full suitability of thermovision analysis of thermal cycle of pad welding, specified self-cooling times will become a base for inference about microstructural transforms in HAZ, whereas cooling rate settlement determines necessary conditions to maintaining required intersequence temperature for assumed heat level input of pad welding, padding weld temperature in self-cooling time function and particular. The thermovision effect and thermal cycle of Inconel 625 on 13CrMo4 -5 steel pad welding thermal cycle analysis has been no yet determined.



149 The paper written by E. Mares and J.H. Sokolowski on “Artificial intelligence-based control system for the analysis of metal casting properties” on a **page 149** informs that the metal casting process requires testing equipment that along with customised computer software properly supports the analysis of casting component characteristic properties. Due to the fact that this evaluation process involves the control of complex and multi-variable melting, casting and solidification factors, it is necessary to develop dedicated software. The metal casting research community has immensely benefited from these developed information technologies that support the metal casting process. Quantitative values were defined as “Low”, “Medium” and “High” to assess the level of improvement in the metal casting analysis by means of the Artificial Intelligence-Based Control System (AIBCS). The traditional process was used as a reference to measure such improvement. As a result, the accuracy, reliability and timeliness were significantly increased to the “High” level.



188 The Manufacturing and processing area section represented by A. Stoić, I. Lacković, J. Kopač, I. Samardžić and D. Kozak on “An investigation of machining efficiency of internal roller burnishing” on a **page 188** presents the investigation of fine machining efficiency of 34CrMo4 steel with roller burnishing tools. Application of roller burnishing process as a clean and environmentally friendly machining process which can replace other pollution processes is of great interests. It is important to evaluate the influence of material properties (primary hardness) for smoothing efficiency and achieving of lower roughness and higher work piece hardness. Results and findings presented in this paper are qualitative and might be slightly different in other machining condition (e.g. higher hardness materials and higher roughness of row material). Smoothing process can be performed on standard machine tools without additional reconfiguration tasks. Process is very rapid. It is very versatile for any workshop and can be conducted without coolant what is additional advantages for the environment and pollution free machining. It was found out that surface roughness is significantly lower after roller burnishing. Roughness ratio (before/after process) and decrease factor was 4 what does not satisfy expected results. Some roughness results after burnishing exceed upper limits.

Education and research trends