Analysis and modelling

7. Reliability estimation for manufacturing processes

M. Kostina, T. Karaulova, J. Sahno (Estonia),
M. Maleki (Portugal)

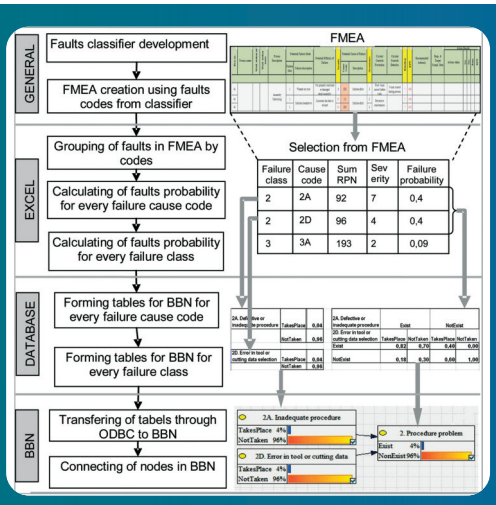
Materials

14. Plastic behaviour and microstructure characterization high manganese aluminuim alloyed steel for the automotive industry

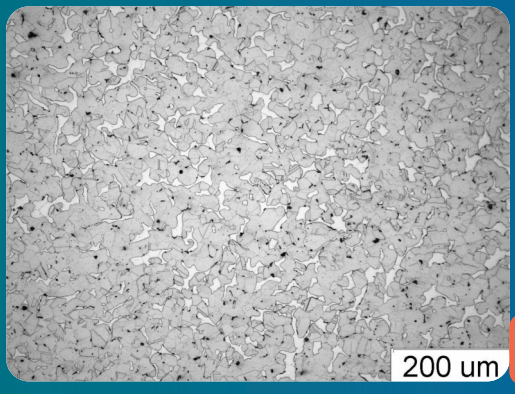
D. Kuc, J. Cebulski (Poland)

22. Structure of EN AW-Al Cu4Mg1(A) composite materials reinforced with the Ti(C,N) ceramic particles

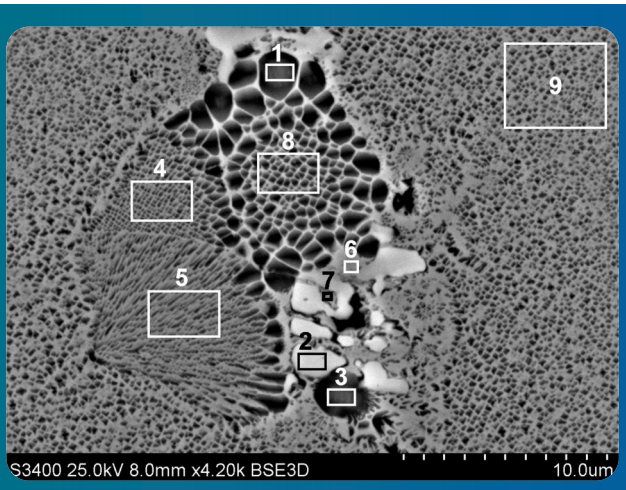
A. Włodarczyk-Fligier, L.A. Dobrzański,
J. Konieczny (Poland)



The Analysis and modelling section represented by M. Kostina, T. Karaulova, J. Sahno and M. Maleki on "Reliability estimation for manufacturing processes" on a **page 7** presents a reliability assessment method with an extension of the existing ones and pooling them to a common framework. The system must identify the most unreliable parts of a production process and suggest the most efficient ways for the reliability improvement. An integrated modelling method based on a system modelling and complemented with a reliability evaluation mechanism has the capability to analyse and design manufacturing systems. The tool developed to analyse a production process, enables companies to analyse the process as a whole as well as its parts and achieve efficient prognosis for the production process reorganization. Expansion of FMEA method, application of Bayesian Belief Network for process reliability estimation, usage of reliability estimation during production route creation. The reliability assessment tool helps engineers quickly and with accurate estimate most unreliable places of production process and indicates ways of their elimination with great efficiency.



Authors: D. Kuc and J. Cebulski in the paper entitled "Plastic behaviour and microstructure characterization high manganese aluminum alloyed steel for the automotive industry" on a **page 14** present tests results of plasticity and liability to brittle cracking at high temperature on Gleeble simulator. Zero resistance temperature (TZW), zero plasticity temperature (TZP) and plasticity reversal temperature (TNP) was determined. The evaluation of the fracture character were conducted with the use of scanning microscopy (SEM). Susceptibility of steel to crack at high temperatures was tested on Gleeble 3800 simulator, research was completed by determination of steel plasticity and stress applying in the next stage the deformation of samples in temperature from 850 to 1175°C. This temperature range corresponds with the field of parameters of plastic processing. For samples after tension the ultimate tensile strength was determined (R_m) together with contraction (Z). Character of fractures of stretched samples was tested with the use of scanning microscope Hitachi S-4200. The tests show that the tested steel is characterised by relatively lower temperatures in comparison with low-alloyed steels. Tested steel has high plasticity in temperature wear to temperature of plastic processing 1150-800°C. The obtained steel is characterised by beneficial properties which outbalance the austenitic steels type TWIP and may be applied in vehicle construction on elements connected with safety.



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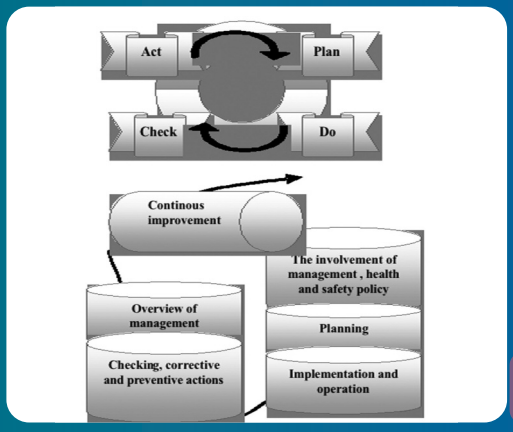
Authors: M. Pytel, M. Góral, A. Nowotnik, J. Sieniawski, M. Drajewicz and W. Ziaja in the paper entitled "Heat treatment and CVD aluminizing of Ni-base René 80 superalloy" on a **page 30** presents the results of microstructure investigations which were carried out on Ni-base René 80 polycrystalline superalloy. It was found out that samples without heat treatment had the typical cast microstructure with many areas of the γ–γ' eutectic, after heat treatment process the microstructure was homogenized, i.e. the eutectic γ–γ' has been dissolved, MC-type carbides were precipitated on the grain boundaries and the chemical composition was balanced. It was found out also that after homogenizing heat treatment the samples had the thicker coating and had more homogenous additive and diffusion layer than the samples with as-cast microstructure. In the future the production of chemical vapour deposited platinum (or Pd, Zr, Hf) aluminide diffusion coatings on nickel base superalloy substrate are planned. This CVD method will be used in the future for the production of modified aluminide bond coats on single crystal Ni-base superalloys underlying the ceramic EB-PVD or LPPS top coatings.



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The Industrial management and organization section represented by R. Nowosielski, M.Spilka and K. Cesarz on "Improvement of the enterprise based on model of OSH management system" on a **page 39** presents the concept and the way to meet the requirements implemented health and safety management system in industrial enterprise like Coking Plant. Based on analysis proposed improvements, which would aim to improve working conditions in the company. The proposed improvements were designed for specificity of work, production scale and nature of possible threats in the analyzed enterprise. It was concluded that effectively functioning system of OSH management can be achieved only with maintaining the principle of continuous improvement. Conditions in the workplace evolve along with the decision to the interference of all employees in the area of potential accident events. Coking Plant has decided to involve all employees in improving the system by reporting their observations in respect their workstations. Employees was rather skeptical approaching the issue. Therefore, the monthly inspections of workplaces in order to detect discrepancies that could cause an accident are carried out. Treatments of this type determine further action to improve work conditions and enable proper functioning of the OSH management system.

Manufacturing and processing

30. Heat treatment and CVD aluminizing of Ni-base René 80 superalloy

M. Pytel, M. Góral, A. Nowotnik, J. Sieniawski, M. Drajewicz, W. Ziaja (Poland)

Industrial management and organization

39. Improvement of the enterprise based on model of OSH management system

R. Nowosielski, M. Spilka, K. Cesarz (Poland)

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