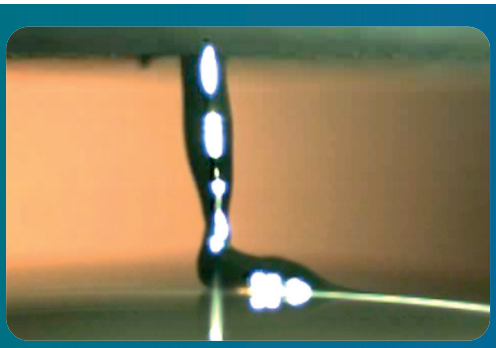
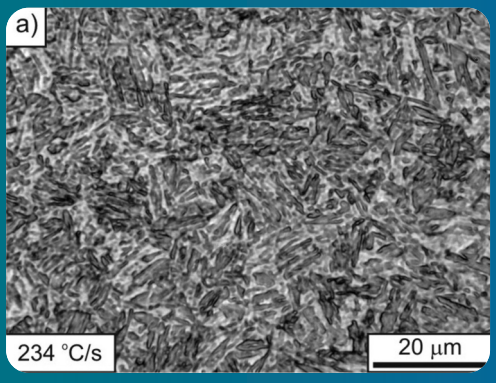
Manufacturing and processing

Properties



59

In the paper entitled "Analyses of the melt cooling rate in the melt-spinning process" by Karpe, B. Kosec and M. Bizjak on a **page 59** the limits of cooling rate over the ribbon thickness and to outline, which property or typical feature of the process has the greatest influence on cooling rate of the melt is presented. Rapid solidification (RS) of metallic melts is important for the development of the advance metallic materials, because enables the production of new alloys with superior properties according to conventionally treated alloys. In practice it turned out that single roll melt spinning process has one of the highest melt cooling rates among all continuous casting processes. But, because very short solidification time and movement of the melt and substrate, melt cooling rate is very difficult to measure with confidence. The calculations show that distance from the contact surface in relation to the thermal properties of the melt, chilling wheel material and contact resistance between metal melt and chilling wheel have the greatest influence on melt/ribbon cooling rate. In the case of continuous casting, significant "long term" surface temperature increase may take place, if the wheel is not internally cooled. Comparison between cooling rates calculated at various thermal resistance assumptions of particular constituents is outlined. A new method for determining contact resistance through variable heat transfer coefficient is introduced which takes into account physical properties of the casting material, process parameters and contact time/length between metal melt/ribbon and substrate and enables cooling rate prediction before the experiment execution. In the case of continuous casting, heat balance of the melt-spinning process is calculated and influence of the chill wheel cooling mode on cooling rate of metallic ribbon is analyzed.



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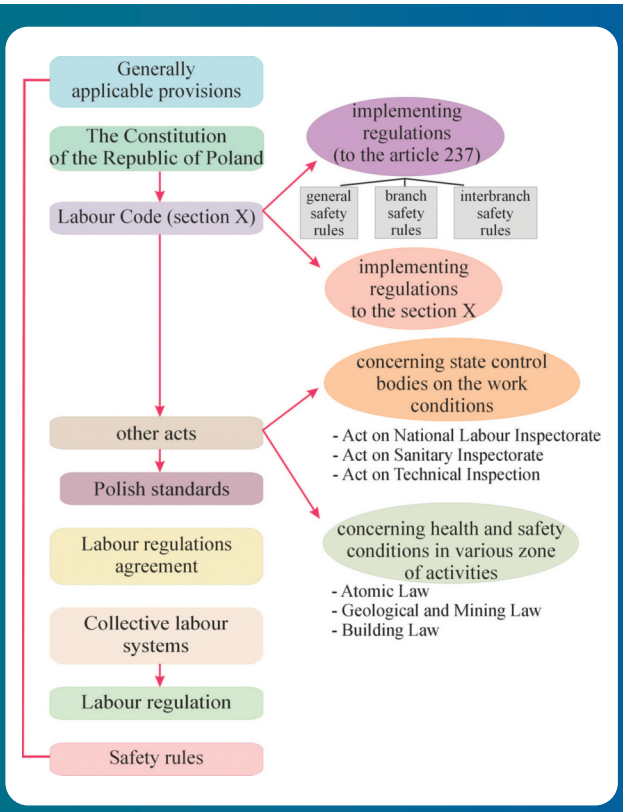
The paper written by M. Opiela, W. Zalecki and A. Grajcar on "Influence of plastic deformation on CCT-diagrams of new-developed micro-alloyed steel" on a **page 78** introduces the investigation results of the influence of plastic deformation and cooling conditions on a structure and a shape of CCT-diagrams of new-developed Nb-Ti-V microalloyed steel. Performed investigations allowed to evaluate the influence of plastic deformation and cooling rate on the course of curves of supercooled austenite transformations of newly elaborated steel. Performed dilatometric research revealed that the steel is characterized with A_{c3}=843°C, A_{c1}=707°C and a relatively low M_s temperature equal 370°C. Plastic deformation of steel at the temperature of 885°C prior to the start of phase transformations results in distinct acceleration of pearlitic transformation and slight translation of bainitic transformation towards shorter times. Elaborated curves of supercooled austenite transformations of studied steel fully predispose it to production of forgings quenched directly from forging finish temperature and successively subjected to high temperature tempering. The obtained CCT diagrams of supercooled plastically-deformed austenite transformations can be useful in determination of cooling condition of the thermo-mechanical processing for high strength forged machine parts obtained from microalloyed steels.



90 The Industrial management and organization section represented by A. Kania, M. Spilka and G. Cieśliński on "Occupational risk assessment at the work station in the selected enterprise" on a **page 90** presents the occupational risk assessment in the selected work stations in the company which operates in the mining industry as well as the legal requirements relating to work safety and occupational risk assessment. The analysis of the work stations in the enterprise disclosed many threats occurring during personnel work. Preparation and usage of the cards of threats identification made possible the unequivocal qualification where and in what situations of the everyday work these threats occur and what is their cause. Next, the occupational risk assessment for two chosen work stations was carried out. On the basis of results of the analysis correcting actions were proposed. Next, the occupational risk assessment after consideration of these actions carried out. The results confirmed efficiency and relevance of the proposed measures. The risk in all cases was minimized from an unacceptable to an acceptable level. The cards of the risk assessment that were made for three work stations in the analyzed organization making possible the introduction of preventive and corrective actions reducing possibility of occurrence of accidents and morbidity of employers on occupational diseases.

Industrial management and organization