SUMMARIES

Chyła P., Bednarek S., Łukaszek-Sołek A., Sińczak J.:

Strain Distribution in ECAP Process with Various Friction Conditions – Numerical Modeling

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In this paper are introduced analytical calculations of strain distribution in ECAP process in plane strain state. Analysed was friction influence on distribution and value of effective strain in channel die band. Numerical calculations were done by using of QForm 3D commercial programme.

Keywords: *ECAP, friction, strain heterogeneity, numerical modeling*

Stefański K., Kubiński W.:

Diminishment of Internal Polygonization of Tubes in Hot Stretch--reducing Mill

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One of the most important issues in hot stretch-reducing process is the maintaining precision of wall thickness. Exactly the same wall thickness at all cross-sections of tubes after stretch-reducing mill increases suitability of tubes in the next treatment processes. Internal polygonization of tubes and its removal during hot reducing is constantly the most important problem. The study is a presentation of test results for decrease of internal polygonization. Internal polygonization, as a result of deformation of tube wall thickness in all stands during hot reducing, can be minimized first of all by optimization of inter-stand tension. The tubes and pipes with minimal internal polygonization could be obtained during experiments of rolling after applying maximal average tension using a developed system for equations of axial forces equilibrium in the rolling mill.

Keywords: *stretch-reducing rolling, steel tubes, internal polygonization*

Kamińska J., Kolczyk J., Żymankowska-Kumon S.:

Effect of Grain Size of the Reclaimed Matrix Ceramic Moulds used in the Lost Wax Technology on the Strength at High Temperature

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Production technology of investment casting involves transmitting the elements of shape, dimensions and properties by filling in the appropriate liquid metal ceramic forms reproduced by a model made of wax removed by melting it. The manufacturing process of investment casting in the

lost wax technology consists of a number of technological operations: preparing of wax models and their assembling in the model units, the preparation of ceramic mixture, successive layers of debris, wax melting in an autoclave, drying the samples at 100 ^{o}C, heating the samples at temperatures ranging from 400 to 700 ^{o}C. So far, the technology was based on the use of ceramic mixture, which the bond was hydrolysed ethyl silicate. Currently, due to environmental protection and improvement of working conditions, more and more binders with alcohol is replaced with an aqueous solution of colloidal silica.

In the study, as the basic of individual layers a ceramic form, used regenerated ceramic mixture derived from foundry and green ingredients. Used ceramic moulds after mechanical reclamation was given to sieve analysis to determine the grain size (d_L). Grain sizes 0.2, 0.4 and 0.63 mm were used for the coating of ceramic moulds. The paper presents results of research aimed at the determination of the relationship between tensile wet strength and grain size of ceramic mould: $R_m = f(d_L)$. Tests were conducted on cylindrical samples, which deposited a layer of reclaimed ceramic material.

Keywords: *foundry, ceramic mould, matrix, temperature*

Karczewski K.:

Application of Water Equivalents Method to Calculations of Cross--Finned Aluminium Heat Exchangers

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On an experimental post were carried out hydraulic and heat research of exchanger elements made of aluminium alloy. The research and calculations make possible to identify the reduction over-all heat-transfer coefficient from oil to heating air. The results of research enable to determine by water equivalents method design and using parameters of heat exchanger.

Keywords: *heat exchanger, water equivalent, Number of Heat Transfer Units, reduction over-all heat--transfer coefficient, heat surface area*

Wilk M., Magdziarz A., Kuźnia M., Jerzak W.:

The Reduction of the Emission of NO_x in the Heat-treatment Furnaces

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Despite the fossil fuel are still dominant source of primary energy in the word, the natural gas is generally used in many branches in industry. The interest in natural gas is caused by new production technologies (shale gas). This situation leads to take an interest in natural gas combustion technologies, especially low-emission combustion. In spite of many advantages of natural gas, it is also a source of nitrogen oxides generated during combustion in high temperature processes. The knowledge of the mechanisms of the formation of NOx allows to modify the combustion process. There are two ways of low emission combustion processes leading to reduce pollutants: “primary and secondary methods”. This paper presents the primary low-emission combustion method using the recirculation of flue gas and air excess ratio.

Keywords: *NO_x, natural gas combustion, low-emission combustion, recirculation of exhaust gases*

Kuźnia M.:

The Influence of Temperature and the Ratio of Air Excess on Combustion Efficiency of Polyolefin Materials

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Combustion of plastics is a very complex process and phenomena, which occur during this process, have not been sufficiently investigated. Polyolefins constitute almost half of all the generated plastics. In this study, the influence of temperature and the ratio of air excess on the concentration of pollutants in flue gases have been presented. The studies carried out on the designed test bench were preceded by a series of thermal analyses (TG, DSC, TG-MS).

Keywords: *combustion, polyolefin wastes, pollutants*