

SUMMARIES

Joulazadeh M.H.:

Environmental Friendly Consumption of Scrap Tires in Eaf's to Save Power & Carbon

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World wastes nearly 1.3 billions of tire/year, while Iran wastes 8 millions pieces of tire annually. This study and investigation shows that waste tires can be a substitute for coal & coke in EAF as environmental friendly. In this study Esfahan Steel Company (ESCo) consumed waste tires with 6 Mg capacity EAF. Thirteen grades of steel including low, medium & high C content as well as low & high alloys were produced during 73 heats. The result was very successful & coke consumption rate reduced from 18 to 0 kg/Mg of steel. Electricity consumption decreased from 448 to 388 kWh/Mg. Stack gas analysis & measuring was done and the achieved results indicate the polluted gases content such as CO, NO_x and SO₂ is much less than the limited range. Industrial tests continued in Iran Alloy Steel Co. where 20 heats were made in 40 Mg capacity EAF with 30 MVA transformer capacities. The results are as follows: waste tires can be substitute for C in EAF steelmaking & the costs lowered by 5 €/Mg; the use of waste tires for additional chemical energy can further decrease electric energy consumption up to by 10–25%. The average S% in steel products was lower than 0.026; the environment is improved by consumption of waste tires in EAF instead of burying them in landfills. The process is reliable, economic & ecological. The large sized scrap tires like these of graders, mining earth movers, trucks & farm tires can be charged in EAF as whole used tires. Dioxin formation peaks at 200°C and decreases unsymmetrically with increasing temperature. Tires have virtually no Hg.

Keywords: scrap tires, EAF, carbon, coke, power

Skubisz P., Sińczak J., Chyła P.:

Reduction of Die Loading by Divided Flow Pattern in the Finisher Die Web Area

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Physical and numerical modelling of the forging process of a complex shape axisymmetrical part has been presented. Three different solutions of forging technology have been analysed in order to obtain improvement in the metal flow kinematics in the last stage of forging in finisher die, as well as, favourable distribution of mechanical parameters in workpiece and tools. Improved design of preform produced divided flow pattern in the finisher die, resulting in reduction of loading and stresses in tools.

Keywords: impression-die forging, divided flow, tool stress analysis, tool life

Czarski A.:

Assessment of Statistical Stability of Steel Strip Hot-rolling Process

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Statistical methods belong to the basic quality tools. Among statistical instruments the statistical process control SPC takes particular place. One of the principal tasks of SPC is monitoring of a process by means of control charts. They are first of all Shewhart's control charts.

The aim of investigations was to assess stability of technological process of hot-rolling of steel strip. There were available the results of thickness measurements made with an X-ray thickness gauge as well as measurements of convexity and wedge shape made with a profile measurement gauge. The assessment of statistical process stability was performed by means of Shewhart's control charts technique. In case of thickness the estimation of capability indices C_p , C_{pk} and P_p , P_{pk} have been carried out, in addition.

Keywords: quality management, statistical methods, statistical process control (SPC), control charts, process capability analysis

Karczewski K.:

Application of Water Equivalents Method to Calculations of Radiation Recuperators with Microfinned Surface

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The calculation algorithm by water equivalents method to radiation recuperators with microfinned surface were elaborated. In this algorithm model research of heat transfer and hydraulic resistance microfinned elements was applied. By elaborated algorithm radiation recuperator with microfinned surface to heat furnace were projected.

Keywords: recuperator, microfinned surface, numer of heat transfer units, water equivalent of air, water equivalent of furnace gas

Bielenin K., Suliga I.:

The Ancient Slag-pit Furnace and the Reduction Process in the Light of a New Archaeological Concept and Metallurgical Research

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In this work the state of archeological and experimental research into slag-pit furnace in the Świętokrzyskie Mountains region was valued. The new archeological concept of "the surface of free solidification" and results of its metallurgical verification were presented. Obtained results constituted piece of evidence supporting the theses connected with the concept of the surface of free solidification of the slag blocks.

Keywords: slag-pit furnace, ancient metallurgy of the Świętokrzyskie Mountains region, slag block