

Additional Distribution: 4. International Conference on New Developments in Metallurgical Process Technology, Cracow, Poland, 17 – 19 September 2012
MSR – Special Fair, Landshut, Germany, 19. September 2012

Ad closing date: 31 July 2012

Publishing date: 15 August 2012

Metallurgy

Metallurgical methods for the production of steels with high manganese contents

Zacharias Georgeou, Joachim Schöttler, Daniela Rohrberg, Karl-Heinz Spitzer, Alexander Newirkowez and Ralph Nyström

(Salzgitter Mannesmann Forschung GmbH, Salzgitter; TU Clausthal, Clausthal-Zellerfeld, Germany; Swerea Mefos, Luleå, Sweden)

Ferrous alloys using the TRIP and/or TWIP effect allow a combination of ultra high-strength and high ductility. The alloying concepts for these steels are based on a manganese content between 12 and 25 % mass content. Other alloying components typically are aluminium and silicon. The presented research is focussing on the assessment of economical viable process routes for the production of high manganese-content steel melts. Routes for mid to long term high production volume using iron-manganese-ores in a blast furnace or for direct reduction are presented. Being crucial for profitability different manganese sources and alloying concepts are discussed and evaluated under the aspect of tramp elements.

Refractory solutions to improve steel cleanliness

Marcos Tomas, Marcus Kirschen, Jens Rotsch, Gavin McIlveney and Gernot Hackl
(RHI AG, Wien and Leoben, Austria)

The demand for clean steel production is ever increasing, principally because steel for more sophisticated processing routes and applications requires smaller sized oxide inclusions. Modifying inclusion morphology, composition, and size is employed to produce lower melting point species and harmless characteristics during rolling. In addition, minimizing residual impurities including sulphur, phosphorous, hydrogen, nitrogen, and carbon is also targeted during clean steel production. RHI provides a range of refractory solutions to enhance steel cleanliness during the entire steelmaking process. In addition, various modelling capabilities are available to optimize tundish efficiency during clean steel production.

Metal Forming

Innovative forming processes for tubes, profiles and sheets made of modern steel grades

Daniel Staupendahl, Christoph Becker, Andres Weinrich, Matthias Hermes and A. Erman Tekkaya
(IUL Institut für Umformtechnik und Leichtbau, Dortmund, Germany)

Reduced production limits during the forming of new steel grades can only be overcome with the development of new production techniques. In response, several new processes were developed at the Institute of Forming Technology and Lightweight Construction of TU Dortmund University. Among these are the 3D profile bending method "TSS bending", the Incremental Tube Forming process, the sheet metal bending process with incremental stress superposition, and the RoProFlex process, which allows the flexible production of profiles with complex cross sections from simple tubular cross sections.

Plant Engineering

RFID application on rolling stands

Dieter Geller, Gerd-Joachim Deppe and Burkhard Helten
(Salzgitter Mannesmann Forschung GmbH, Duisburg; Vallourec & Mannesmann Deutschland GmbH, Düsseldorf – both Germany)

In a plug mill for seamless tubes the sizer at the end of the rolling line essentially defines the dimensions of the tubes. In the plug mill of Vallourec & Mannesmann Tubes Germany at Düsseldorf-Rath the sizer consists of ten stands, in each of which the right cage out of a stock of about 400 has to be inserted. This mapping arises from the specifications of the rolling lot. By applying an adapted RFID (Radio Frequency Identification) system an improved loading of the stands with cages could be achieved. Sequentially the actual status of allocation is automatically logged and checked with the demands for the respective rolling lot.

Emboss and stamp writing recognition on metallic surfaces in the metallurgical plant

Lothar Thieling and Sebastian Seegert

(Institut für Nachrichtentechnik, Fachhochschule Köln, Köln, Germany)

Embossing and stamping writing on metal surfaces is commonly used in the metal producing and processing industry. Core approach of this paper is to consider the shadow cast on the labeled surface, the required specific lighting and in addition a concerted pre image processing algorithm. Subsequent image processing algorithms allows a position and dimension invariant detection and scaling of the labeling. Afterwards classical OCR methods can be used for the generated results.

Innovation

High reactivity also in low temperatures

Fred Zellerhoff

(Gebr. Lödige Maschinenbau GmbH, Paderborn, Germany)

The combustion of sulphurous organic substances releases sulphur oxides which are harmful to the environment and health. These compounds must be extracted from the flue gas by a suitable procedure. The degree of adsorption in flue gas desulphurization in incinerators can be optimized by the semi-dry process using Lödige mixing reactors: due to precisely adjusted humidification this can be achieved without losses in the particle and thus reaction surface.