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Metallurgy

2nd ISIJ-VDEh-Jernkontoret Joint Symposium on Metallurgy

The 2nd ISIJ-VDEh-Jernkontoret Joint Symposium on Metallurgy was held in Stockholm, Sweden, from 12 until 13 June 2017 after Osaka, Japan, in 2013. With 75 participants in total from Austria, Finland, Germany, Japan and Sweden this long-established meeting on metallurgical research and development was well attended. From VDEh side this cooperation dates back to the year 1974, when the first Seminar on Metallurgy took place in Düsseldorf among members of Iron and Steel Institute of Japan (ISIJ) and Steel Institute VDEh. From Jernkontoret view the symposium dates back to the year 1979, when the first Japan Nordic Countries Joint Symposium took place.

A special topic of this high ranking scientific technical exchange was circular economy in the steelworks, energy efficiency, environmental protection and CO₂-avoidance. Additional focus was laid on reduction techniques, melting metallurgy and continuous casting. Broad interest received the Japanese R&D-programme COURSE 50 aiming at providing a blast furnace technology with integrated gas scrubbing and top gas recycling in Japan until 2050 with 30 % less CO₂ emissions. With the HYBRIT R&D-programme, SSAB peruses CO₂ free hot metal production in Sweden until 2045.

Subsequent to the two days metallurgical Seminar with 28 detailed lectures following steel production sites in Sweden were visited: Blast furnace 4 and oxygen steelwork at SSAB Öxelösund and the electric steel mills Ovako Smedjebacken, Ovako Hofors, Outokumpu Stainless Avesta und Sandvik Materials Sandviken.

The 3rd ISIJ-VDEh-Jernkontoret Joint Symposium on Metallurgy was appointed to be organised in Germany in 2020.

Contact: Dr. Reinhard Fandrich, Phone: +49 (0)211 6707-304 or e-mail: reinhard.fandrich@stahl-zentrum.de

Roadmap hydrogen

The Steel Institute VDEh has worked in 2016 and 2017 together with the member works on a roadmap hydrogen with the aim to reduce CO₂ emissions in iron and steelmaking. Massive CO₂ emissions are possible with the change over from the carbon based integrated blast furnace converter route to a hydrogen based direct reduction and electric arc furnace route. This would result in the need of high amounts of reliably available hydrogen, CO₂ free electrical energy supply in high amounts, high

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investments for new plants and decommissioning of the plants to be replaced and higher production costs. This could lead to high CO₂ abatement costs and make this technically possible process change uneconomical if not supported.

Contact: Dr. Hans Bodo Lungen, Phone: +49 (0) 211 6707-444 or e-mail: hans-bodo.luengen@stahl-zentrum.de

European Steel Technology and Application Days

The European Steel Technology and Application Days were invented by Steel Institute VDEh in 2013. They took first place in Paris in April 2014 as a joint event by Steel Institute VDEh, the Austrian ASMET, French FFA (later implemented into A3M), Swedish Jernkontoret and Italian AIM, followed by second event together with METEC in Düsseldorf in June 2015. The 3rd ESTAD took place in Vienna from 25 to 29 June 2017 in parallel to the 9th European Continuous Casting Conference with 1100 participants from 35 countries, 421 presentations and 50 exhibitors. In the plenary session Hans Jürgen Kerkhoff, Chairman of Steel institute VDEh and President of the German Steel Federation, gave a keynote presentation entitled "Political conditions for sustainable innovations in steel" There were several technical presentations from Steel Institute VDEh and VDEh Betriebsforschungsinstitut. Now the preparation and organization of the 4th ESTAD already started which will take place together as accompanying conference of the world's largest steel exhibition, the METEC, in Düsseldorf from 24 to 28 June 2019.

Contact: Dr. Hans Bodo Lungen, Phone: +49 (0) 211 6707-444 or e-mail: hans-bodo.luengen@stahl-zentrum.de

Steel Materials

SCT 2017 Conference

The 5th International Conference on Steels in Cars and Trucks hosted by the Steel Institute VDEh took place from the 18 to 22 June 2017 in Amsterdam-Schiphol. 'Bringing the automotive, supplier and steel industries together' was one of the two goals behind this year's SCT 2017. This motto reinforces what the modern steel industry is all about: partnerships across value chains being made up of industry, research and development professionals. And it was a great success. More than 140 lectures were given and nearly 500 participants joined the conference and the accompanying exhibition. The second motto of SCT 2017 was: 'Future trends in steel development, processing technologies and applications'. Following that motto different main topics had the headline: "New high strength steels", "New steel solutions for E-mobility", "Joining technologies", "Simulation of sheet metal forming", "Properties of hot stamping steel grades", "High performance bainitic steel grades", "Liquid metal embrittlement", "Zinc-Magnesium coatings", "Lightweight forging", "Avoidance of edge crack" ... // The proceedings are available at Verlag Stahleisen GmbH, Düsseldorf; www.stahleisen.de



Contact: Dr.-Ing. Hans-Joachim Wieland, Phone: +49 (0)211 6707-426 or e-mail: hans-joachim.wieland@vdeh.de

Common research in mechanical joining technology – 7. Colloquium on Joining Technology 12/13 December 2017, Dresden



The colloquium on mechanical joining technology organized by the European Research Association for Sheet Metal Working (EFB), the Research Association for Steel Application (FOSTA) and the Research Association on Welding and Allied Processes of DVS developed to a constant in the joining sector. With the development of new materials and the increasing use of hybrid compounds, the joining technology is requested to develop new solutions to these challenges. This colloquium offers users a holistic overview of current research activities. This offers the possibility to get in contact and in discussions with manufacturers, users and researchers. For more information: www.kolloquium.fuegetechnik.org

Contact: Franz-Josef Heise, Phone: +49 (0)211 6707-837 or e-mail: franz-josef.heise@stahlforschung.de

The Lightweight Forging Initiative goes international as it enters the third phase

In July 2017, "The Lightweight Forging Initiative Phase III" (Initiative Massiver Leichtbau, www.massiverLEICHTBAU.de) was launched. With immediate effect, a cooperation of around 40 companies from Europe, Asia and the US will devote its efforts to determining the lightweight design potential of hybrid and heavy commercial vehicles in terms of the powertrain, chassis and transmission. The results of the study will be available in early summer 2018. The fruitful collaboration among the companies of the Initiative under the auspices of the German Forging Association (Industrieverband Massivumformung e. V.) and the Steel Institute VDEh will now continue with international partners in project phase III. Under analysis this time are forged steel components in the powertrain and chassis of a hybrid car – a vehicle type which will become increasingly important over the next few years until complete electrification of passenger cars is on the roads.

Contact: Dr. Christoph Keul, Phone: +49 (0)211 6707-424 or e-mail: christoph.keul@vdeh.de



New Stahl-Eisen-Prüfblatt SEP 1571 "Evaluation of inclusions in special steels based on their surface areas" has been published

The Stahl-Eisen-Prüfblatt SEP 1571 "Evaluation of inclusions in special steels based on their surface areas/Bewertung von Einschlüssen in Edelstählen auf Basis der Einschlussflächen" has been published in August 2017 and is available at the publishing house Stahleisen GmbH. This test specification describes the examination of non-metallic inclusions in the form of sulfides and oxides in the polished section of special steels. The results achieved with this evaluation method are compatible to the results of the withdrawn standard DIN 50602 "Metallographische Prüfverfahren; Mikroskopische Prüfung von Edelstählen auf nichtmetallische Einschlüsse mit Bildreihen" so past know-how can still be used. Currently workshops are offered to introduce the new SEP 1571.

Contact: Dr. Christoph Keul, Phone: +49 (0)211 6707-424 or e-mail: christoph.keul@vdeh.de

Energy

Joint Collaboration Workshop with POSCO

In the mid of June the first joint collaboration meeting with POSCO and the Steel Institute VDEh in the area of energy technology was held. In addition to work visits in Saarland (Dillinger and ROGESA) and at thyssenkrupp, a meeting with the Energy Technology Committee took place. The focus was on the upcoming challenges with regard to CO₂ reduction and energy efficiency. At the plant inspections, the focus was on the various applications of the handling of by-product gases, gasometers and the power plants.

Contact: Marten Sprecher, Phone: +49 (0)211 6707-417 or e-mail: marten.sprecher@stahl-zentrum.de

New Energy Efficiency Networks launched

Two new Energy Efficiency Networks were launched during the last months. In the VIK-EEN Brandenburg network ArcelorMittal Eisenhüttenstadt is a partner together with the Cement and Chemistry industry. In the Saarland the Network ESTA - Energieeffizienz mit STAHL were launched with AG der Dillinger Hüttenwerke, ROGESA Roheisengesellschaft Saar mbH, Saarschmiede GmbH, Saarstahl AG, Zentralkokerei Saar GmbH. More Infos can be found at www.effizienz-mit-stahl.de/.

Contact: Marten Sprecher, Phone: +49 (0)211 6707-417 or e-mail: marten.sprecher@stahl-zentrum.de

Environment

Dust

Since 2014 the density-dependent general dust limit (Allgemeiner Staubgrenzwert, AGW) of 1.25 mg/m³ has been applied in Germany for the alveolar (A) dust fraction. If this limit value cannot be complied with, a transitional regulation applies until 31 December 2018. During this period, the old AGW for A-dust of 3 mg/m³ can be used to check the effectiveness of protective

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measures at the workplace. In order to be able to use this transitional period, an industry concept for the steel industry is being developed, which is based on TRGS 504, activities with exposure to A- and E-dust.

Contact person: Norbert Hatscher, Phone: +49 (0)211-6707-430 or e-mail: norbert.hatscher@stahl-zentrum.de

Classification of substances, examples titanium dioxide and cobalt

On the basis of the CLP regulation, many substances are being re-classified at EU level, which also affect the steel industry. Two current examples are titanium dioxide and cobalt, which are proposed to be classified amongst others as "probably carcinogenic in humans".

Titanium dioxide is a substance used in many industries and applications, even in food, painting and cosmetics - so far without risks. The limit value discussed for cobalt is close to the natural background concentration; at the same time, cobalt is a tramp element in many natural raw materials. Besides, as an alloying element it is firmly embedded in the steel matrix so that there is no availability and therefore no risk for the health and environment. An initiative is to be launched via the umbrella organisations, which generally critically evaluates the limit value finding and leads to an approach that protects people and the environment without unnecessarily restricting business and substance use.

Contact person: Norbert Hatscher, Phone: +49 (0)211-6707-430 or e-mail: norbert.hatscher@stahl-zentrum.de

REACH Workshop, IUCLID 6

IUCLID is the database system of the European Chemicals Agency (ECHA), which is used to fulfil obligations to provide data under the REACH Regulation. Since the beginning of the year 2017 only the new version IUCLID 6, which replaces the previous version IUCLID 5, can be used. This software must be used by all member companies to update REACH dossiers. In order to facilitate the change over to the member companies, a REACH workshop will be held at the Stahl-Zentrum on 16 November 2017, in which representatives of consortia relevant to the steel industry will inform about the current status of the dossier updates and a representative of the national authority, BAuA, will present the new software.

Contact person: Norbert Hatscher, Phone: +49 (0)211-6707-430 or e-mail: norbert.hatscher@stahl-zentrum.de

Steel Academy and Steel Library

Steel Academy

The Steel Academy will establish three new seminars to be held in 2018:

- "Bright Steel – Production and Properties", 30 - 31 January, Düsseldorf.

The Steel Academy reinstated this scientific event after 27 years – the last "Bright Steel Symposium" took place in 1990.

- "Rolling of Flat Products", 5 - 7 February, Aachen. This seminar will take place in cooperation with IBF and IEHK of Aachen University and develops the range of seminars on the steelmaking process route from Cokemaking to Continuous Casting.
- "Corrosion Behaviour of Stainless Steels", 30 - 31 October, Düsseldorf. Cooperation partner is the BAM Bundesanstalt für Materialforschung und -prüfung. This seminar conceptually completes the existing seminar „Stainless Steels – Properties and Applications“.

Contact: Peter Schmieding, Phone: +49 (0)211 6707-478 or e-mail: schmieding@stahl-akademie.de

Steel Library

Having worked on modifications for the past six months the Steel Library will shortly relaunch the international literature database SteelLit. The database contains 470.000 abstracts of conference proceedings, articles, essays and book chapters on the subject "Iron and Steel".

Contact: Peter Schmieding, Phone: +49 (0)211 6707-478 or e-mail: schmieding@stahl-akademie.de