Stahl | Steel Institute VDEh

Steel Academy

Seminar

Hydrogen-based transformation of the steel industry

Technology and challenges of CO_2 neutral steelmaking

6 - 8 March 2024
Düsseldorf, Germany

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Seminar's Target

Europe wants to become climate-neutral by 2050 and already save 55% of greenhouse gases by 2030 compared to 1990. The EU Climate Act sets these targets in law for the first time. For large parts of the European steel industry, these targets mean a far-reaching technological change. The technical solution has been found and is: Replace coal with hydrogen! But how does the new process route work in detail? What are the challenges? In three days, the seminar will provide a technical overview of the biggest technology change in the steel industry for decades.

Organisation / Registration

Steel Academy
Steel Institute VDEh
Mr Peter Schmieding
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Registration Fee

EUR 1.090,00* registration fee VAT-free plus
EUR 305,00 conference package (total amount 1.394,50 EUR)

EUR 1.290,00 registration fee VAT-free plus
EUR 305,00 conference package (total amount 1.594,50 EUR)

* for employees of member companies and individual members of the Steel Institute VDEh. Scientific staff of universities gets a 50 % off.

+++ as part of the VDEh young talents promotion also young engineers (up to 35 years) of member companies receive a 50% discount +++

The conference package includes food and beverages during the seminar (incl. 19 % VAT). This fee does not include the hotel room. A free with-drawal from the seminar is possible until two weeks prior to the start. Then, 25% of the seminar fee must be paid. The total registration amount will be charged for no show or cancellation from the first day of the event. The participant has to bear the cancellation costs of the seminar hotel.

Content

- Ways to CO_2 neutral steel production
- Technologies of current direct reduction concepts
- Iron ores for hydrogen-based direct reduction
- Reduction technologies of iron ore fines with hydrogen
- Green ironmaking with hydrogen and ammonia
- Hydrogen as a challenging atmosphere for refractories
- Electric arc furnace technology - AC and DC
- EAF and OBF power supply
- Technology of the OBF (Smelter)
- Melting of DRI and HBI in the EAF
- Future importance of steel scrap
- Project SALCOS: Steelmaking route DR - EAF
- Project tkH2Steel: Steelmaking route DR - OBF - Converter
- Slags of CO_2 neutral steel production
- Hydrogen production, transport and storage
- Green power production and availability
- Decarbonisation of downstream processes – H2 burner
- A label system for green steel and green lead markets

Technical Chairman

Jochen Schlüter

Venue

NH Düsseldorf City North
Münsterstr. 230-238
40470 Düsseldorf, Germany
https://www.nh-hotels.com/en/hotel/nh-duesseldorf-city-nord

The Steel Academy will automatically make a room booking for the participants at the NH Düsseldorf City North from 5-8 March 2024 for a special rate of EUR 96,00 per night incl. breakfast. The hotel room bill will be settled by you upon departure. Please advise at your registration, if you do not need a reservation or whether you would like to stay longer in the hotel.

Recommendation: The seminar ends on Friday afternoon – take the chance to spend the weekend in Düsseldorf! There is a beautiful old town with several famous breweries

PROGRAMME

Wednesday, 6 March 2024

09.00 **Introduction:** Peter Schmieding / Jochen Schlüter

09.45 **Ways to a CO_2 neutral steel production**
Hans Bodo Lüngen / Peter Schmöle
EU requirements / CO_2 emissions / Smart Carbon Usage / Carbon Direct Avoidance / Development of direct reduction

11.00 coffee break

11.30 **Technology of current direct reduction concepts**
Jochen Schlüter
Construktion und design / Reduction with hydrogen / Concept Midrex / Concept HyL/Energiron

13.00 lunch break

14.15 **Iron ores for hydrogen based direct reduction**
Rénard Chaigneau
Iron ore pellets are the current raw material for direct reduction. Also for efficient hydrogen-based reduction?

15.15 coffee break

15.45 **Reduction technologies of iron ore fines with H2**
Johannes Schenk
Fluidized bed based direct reduction / Plasma smelting reduction

16.30 **Green ironmaking with hydrogen and ammonia**
Yan Ma
Macro-, meso-, micro- and atomic scale views of hydrogen-based reduction / Reduction with ammonia

17.15 **H2 as a challenging atmosphere for refractories**
Jens Sperber
Role of OBF in decarbonization / OBF versus EAF / OBF types: circular and rectangular

18.00 **End of 1st day** => 19.00 common dinner

Thursday, 7 March 2024

09.00 **Electric arc furnace technology – AC / DC**
Klaus Krüger
Historical development / construction / Process engineering of the direct current and three-phase arc furnace

10.00 coffee break

10.30 **EAF and OBF power supply**
Klaus Krüger

11.15 **Technology of the OBF / Smelter**
Ralf Nörthemann
Role of the smelter/OBF in decarbonisation / Smelter/OBF versus EAF / Smelter types: circular and rectangular

12.15 lunch break

13.30 **Melting of DRI and HBI in the EAF**
Markus Abel
DRI- and HBI-production and transport / Operation with the input of DRI / Equipment design for use of DRI

14.30 **The future importance of steel scrap**
Klaus Krüger
Recycling / Scrap quantities and qualities / Scrap availability / Tramp elements / Significance in the future

15.15 coffee break

15.45 **SALCOS: Process route DR – EAF**
Johannes Höffgen

16.30 **tkH2Steel: Process route DR – Smelter – Converter**
Nils Jäger

17.15 **Open discussion** on transformation challenges

18.00 **End of 2nd** day => 19.00 common dinner

Friday, 8 March 2024

09.00 **Slags of CO_2 neutral steel production**
David Algermissen
Problem of slag quantity in EAF / Slags in the oxidizing EAF and the reducing OBF / Quality & use of slags

10.00 coffee break

10.30 **Hydrogen production, storage and transport**
Karsten Pinkwart
Infrastructure concepts for H2 and electricity / Differences between the processes / Hydrogen vs. oxygen / H2 distribution

12.00 lunch break

13.00 **Green power production and availability**
Minias Höfinghoff
Energy market and economy / Energy production and green energy within the framework of the sustainability goals

13.45 **Decarbonisation of downstream processes – H2 burner**
Nico Schmitz
Requirements / Safety engineering / Control of burner systems / Influences on furnace operation / NOx emissions

14.30 **A label system for green steel and green lead markets**
Martin Theuringer

15.15 **End of seminar**

SPEAKERS Markus Abel, tripleS ■ Dr.-Ing. David Algermissen, FEhS Institut für Baustoff-Forschung ■ Dr. ir. Rénard Chaigneau, Baffinland Iron Mines Europe B.V. ■ Johannes Höffgen, Salzgitter Flachstahl GmbH ■ Minias Höfinghoff, ECG Energy Consulting ■ Dr. Nils Jäger, thyssenkrupp Steel Europe ■ Prof. Dr.-Ing. Klaus Krüger, Engineering Office Klaus Krüger ■ Dr. Yan Ma, Max-Planck-Institut für Eisenforschung ■ Dr.-Ing. Hans Bodo Lüngen, Neuss / Prof. Dr.-Ing. Peter Schmöle, Dortmund ■ Ralf Nörthemann, SMS group ■ Prof. Dr. rer. nat. Karsten Pinkwart, University of Karlsruhe ■ Prof. Dr.-Ing. Johannes Schenk, Montanuniversität Leoben ■ Jochen Schlüter, Dortmund ■ Jens Sperber, Steuler KCH-GmbH ■ Dr.-Ing. Nico Schmitz, RWTH Aachen ■ Dr. Martin Theuringer, German Steel Federation ■ Organisation: Peter Schmieding, Steel Academy, Steel Institute VDEh