

Online-Seminar / Live Stream

Oxygen Steelmaking

28 - 30 September 2020
at 8.30 a.m. till 1 p.m. CET



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TECHNICAL CHAIRMEN

Karl-Heinz Spitzer, TU Clausthal / Jochen Schlüter, SMS group

ONLINE SEMINAR ORGANISATION

Technical quality:

The Steel Academy attaches great importance to the audio-visual quality of its online seminars. This converter seminar will be broadcast as a live-stream from Steel Academy's film studio in Dusseldorf – with high quality camera, microphone and lighting. In the picture will be shown the speaker and his presentation. A moderator leads through the lectures.

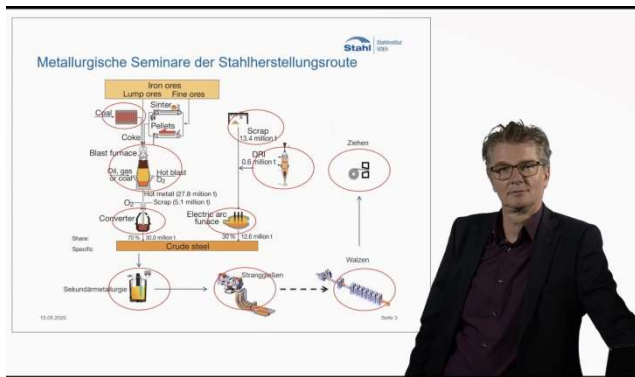


Photo: P. Schmieding, Steel Academy

Online seminar - how does it work?

- after seminar registration you receive an e-mail with a link and a pass word
- at seminar's starting the link leads you to the streaming platform vimeo.com
- you log in with the pass word
- you need just a PC / laptop / tablet / mobile phone
⇒ no special program or software is required.

Schedule:

3 days, 4,5 hours in the morning 8.30 a.m. till 1 p.m.

Seminar handouts:

Before seminar's starting the participant can download the presentations as a pdf.

CONTENT

- Design, construction and types and of oxygen converters
- Thermodynamic and Kinetic Basics in the Converter Process
- Tramp Elements
- Hot-Metal Pretreatment
- Computational Fluid Dynamics in the Converter
- Chemical Reactions Kinetics:
Refining Reactions and Slag Forming in the BOF Process
- Practical Approach: Converter Process Control at Tata IJmuiden
- Mass Balance and Heat Balance
- Converter Process Modelling
- Refractory Materials for BOF
- Environmental Aspects: Dedusting
- Chemical Compositions and Qualities of Iron Ores
- Comparison of different Converter Operation Practices:
US - Europe - Japan - China

TARGET GROUP

Although oxygen steelmaking is a well-known process there are some current challenges for the operating engineer: process control and operating practices, environmental aspects, modelling and CFD. Next to these new questions the program also includes the important basics thermodynamics, chemical reactions kinetics, heat and mass balance and a lecture on tramp elements.

Our target groups are:

- Steel shop operating staff
- Employees in R&D
- Supervisors responsible for decisions on metallurgy

ORGANISATION AND REGISTRATION

Steel Academy - Steel Institute VDEh
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REGISTRATION FEE

€ 750,00* // € 850,00 VAT-free

* for employees of member companies and individual members of the Steel Institute VDEh. Scientific staff of universities gets a 50 % off. Also 50 % discount for each additional participant from the same company.

Monday, 28 Sept 2020

- 08:30 **Introduction to the seminar**
Peter Schmieding
- 08:40 **Design, construction and types of oxygen converters**
Jochen Schlüter
history of Bessemer- and Thomas-converters / design, construction and equipments of LD- and OBM-converters
- 09:45 questions and answers / break
- 10:00 **Tramp elements**
Wolfgang Bleck
importance and impacts of Phosphor, Nitrogen, Copper etc
- 11:00 questions and answers / break
- 11:15 **Thermodynamic and kinetic basics in the converter process**
Karl-Heinz Spitzer
reactions and transport in the converter / basics of a model on thermodynamics and kinetics / slags: structure and importance
- 12:00 questions and answers / break
- 12:15 **Hot-metal pretreatment**
Jochen Schlüter
reactions and processes for the removal of silicon, phosphorus and sulphur / HMD / DDD / injection technology / KR process; deS-agents
- 13:00 questions and answers / afterwards end of 1st day

Tuesday, 29 Sept 2020

- 08:30 **Chemical reaction kinetics, Part I: refining reactions in the BOF process**
Helmut Lachmund
oxidation of C, Si, Mn, P, S, Fe and their interactions / achievable contents in the crude steel / gas reactions (CO, CO₂, H₂, N₂)
- 09:15 questions and answers / break
- 09:30 **Practical Approach - BOF development and process control at Tata Steel Europe IJmuiden**
Jan Brockhoff
- 10:15 questions and answers / break
- 10:30 **Chemical reaction kinetics, Part II: slag forming in the BOF process**
Helmut Lachmund
slag: forming, reactions, properties / final slag composition

- 11:15 questions and answers / break
- 11:30 **Refractory materials for BOF**
Jochen Schlüter
interaction metallurgy, slags and refractory materials / wear mechanism / failures
- 12:00 questions and answers / break
- 12:15 **Computational fluid dynamics in the converter**
Hans-Jürgen Odenthal
transport equations / physical (water modelling) and numerical simulation (CFD) / specific converter flow phenomena (supersonic jets, gas bubbling, post combustion) / CFD examples AOD and BOF
- 13:00 questions and answers / afterwards end of 2nd day

Wednesday, 30 Sept 2020

- 08:30 **Mass balance and heat balance, Part I**
Dieter Senk
heat of reactions in refining and slagging / kinetics of scrap melting / kinetics of DRI melting / post combustion
- 09:15 questions and answers / break
- 09:30 **Converter process modelling**
Bernd Kleimt
dynamic models for online monitoring and control of oxygen refining processes / examples for BOF, AOD and VOD converters
- 10:00 questions and answers / break
- 10:15 **Mass balance and heat balance, Part II**
Dieter Senk
- 11:00 questions and answers / break
- 11:15 **Environmental aspects: Dedusting**
Rüdiger Deike
dust formation in the BOF process / typical dust composition / dust cleaning systems / behavior of Na, K and Zn at high temperatures
- 12:00 **Chemical compositions and qualities of iron ores**
Hans Bodo Lungen
iron ores for the steel industry: worldwide reserves and qualities
- 12:30 **Global comparison of converter operation practices: US – Europe – Japan – China**
Jens Kempken
- 13:00 questions and answers
afterwards **end of Seminar**

SPEAKERS Prof. Dr.-Ing. Wolfgang Bleck, Department of Ferrous Metallurgy, RWTH Aachen University ■ Dipl.-Ing. Jan Brockhoff, Tata Steel Europe IJmuiden ■ Prof. Dr.-Ing. Rüdiger Deike, University Duisburg-Essen ■ Dr.-Ing. Jens Kempken, SMS group GmbH, Düsseldorf ■ Dr. Bernd Kleimt / Dr. Martin Schlautmann, VDEh-Betriebsforschungsinstitut, Düsseldorf ■ Dr.-Ing. Helmut Lachmund, AG der Dillinger Hüttenwerke ■ Dr.-Ing. Hans Bodo Lungen, Steel Institute VDEh, Düsseldorf ■ Prof. Dr.-Ing. Hans-Jürgen Odenthal, SMS group GmbH, Düsseldorf ■ Dipl.-Ing. Jochen Schlüter,

PROGRAMME

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