

Online Seminar / Live Stream

Ironmaking

Basic course: 4-5 May 2021

Advanced course: 8-9 June 2021

each at 12.30 p.m. to 5.30 p.m. CET Berlin



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TECHNICAL CHAIRMEN

Prof. Dieter Senk / Prof. Peter Schmöle

ONLINE SEMINAR CONCEPT

The Steel Academy attaches great importance to the audio-visual quality of its online seminars. This BF seminar will be broadcast as a live-stream from Steel Academy's film studio in Düsseldorf – with high quality camera, microphone and lighting. In the picture will be shown the speaker and his presentation – like in a TV news program.

Photo: P. Schmöle during an online lecture at Steel Academy's studio

Online seminar - how does it work?

- 2-3 days before seminar's starting the participant receives an e-mail with a link and a password
- the link leads you to the streaming platform vimeo.com
- you log in with the password
 - ⇒ we recommend using earphones/headphones and LAN connection or good WLAN

Schedule

(2 x) 2 days, each day 5 hours, 12.30 p.m. till 5.30 p.m. CET

Seminar handouts

2-3 days before seminar's starting the participant can download the presentations as a pdf

Note

Cancellation free of charge is not possible after receiving of the log-in data and the presentations

CONTENTS (separate booking possible)

Basic Course

- Crash course: Materials chemistry
- Blast furnace layout
- Resources, types and characteristics of iron ores
- Agglomeration of fines: Sintering and pelletizing
- Cokemaking and requirements on coke
- Chemical and physical processes in the blast furnace
- Application of reducing agents
- Blast furnace performance

Advanced Course

- Operational practices and challenges
- Hearth and deadman dynamics
- Modelling and simulation
- Injection of carbon-hydrogen carriers into the BF
- Various BF operation modes worldwide
- Energy network in integrated iron and steel works
- Quality and use of blast furnace slags
- Environmental protection
- Direct reduction and hydrogen-based reduction

TARGET GROUPS

BF operating and maintenance staff / Supervisors responsible for decisions on metallurgy and energy / Raw material and purchasing staff / Mining staff

ORGANISATION & REGISTRATION

Steel Academy • Steel Institute VDEh
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REGISTRATION FEE

1 module: € 540,00* // € 590,00 VAT-free
Both modules: € 900,00* // € 990,00 VAT-free

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

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

PROGRAM

Module 1: FUNDAMENTAL COURSE

Tuesday, 4 May 2021

- 12.30 p.m. **Introduction to the course** - Peter Schmieding
- 12.45 p.m. **Crash-course: Materials chemistry**
Dieter Senk
Thermodynamical equilibria / Phase diagrams / System Fe-C-O₂ / Slag diagrams
- 2.15 p.m. **Blast furnace layout**
Hans Bodo Lungen
BF design and construction / Refractories / Inner zones
- 3.00 p.m. **Resources, types and characteristics of iron ores**
Rénard Chaigneau
Resources and deposits / Types and grades of ores
- 4.00 p.m. **Agglomeration of fines: Sintering and pelletizing**
Dieter Senk
Sintering, pelletizing, mixing
- 5.30 p.m. **End of 1st day (module 1)**

Wednesday, 5 May 2021

- 12.30 p.m. **Coal, cokemaking and requirements on coke**
Peter Liszio
Coal / Cokemaking process / Demands on coke quality
- 1.45 p.m. **Chemical and physical processes in the BF**
Peter Schmöle
Process diagrams / Heat and mass balances / Gas flow / Flow of liquids / Cohesive zone / Deadman / Coke quality
- 3.15 p.m. **Application of reducing agents**
Alexander Babich
Coke, coal, plastics, biomass, hydrogen-containing gases / Gasification mechanisms and rates / Injection technology
- 4.30 p.m. **Blast furnace performance**
Peter Schmöle
BF operation modes / Carbon consumption and CO₂-emissions / Productivity / Top gas energy
- 5.30 p.m. **End of 1st module**

Module 2: ADVANCED COURSE

Tuesday, 8 June 2021

- 12.30 p.m. **Introduction to the course** - Peter Schmieding
- 12.45 p.m. **Hearth and deadman dynamics**
Robert Nightingale
Deadman dynamics / Floating or sitting? / Sensing deadman condition / Coke quality issues / Deadman renewal
- 2.00 p.m. **Modelling and simulation**
Alexander Babich
Options and limits / Programs in use and development
- 3.15 p.m. **Operational practices and challenges**
Maarten Geerdes
The burden / Burden descent / Circumferential symmetry / Tuyeres / Stops and starts
- 4.45 p.m. **Injection of carbon-hydrogen carriers into the BF**
Peter Schmöle
Hydrogen input with hot blast, coke and auxiliary reducing agents / Effects on blast furnace operations
- 5.30 p.m. **End of 1st day (module 2)**

Wednesday, 9 June 2021

- 12.30 p.m. **Various BF operation modes worldwide**
Hans Bodo Lungen / Peter Schmöle
- 1.15 p.m. **Energy network in integrated iron & steel works**
Hans Bodo Lungen / Peter Schmöle
Use of process gases in integrated iron and steel works / Energy recovery and use
- 2.00 p.m. **Quality and use of blast furnace slags**
Dieter Senk
Slag formation & control/ Slag application / Heat recovery
- 3.15 p.m. **Environmental protection**
Jens Traupe
Environmental regulations / Classic environmental protection / Blast furnace and climate change / Carbon2Chem
- 4.15 p.m. **Direct reduction and hydrogen-based reduction**
Hans Bodo Lungen
Midrex / Energiron HyL / Hydrogen-based reduction
- 5.30 p.m. **End of seminar**

SPEAKERS Dr.-Ing. Alexander Babich, Department of Ferrous Metallurgy, RWTH Aachen University ■ Dr. ir. Rénard Chaigneau, Baffinland Iron Mines Europe B.V., Amsterdam ■ Dr. Maarten Geerdes, Geerdes Advies, Castricum ■ Dipl.-Ing. Peter Liszio, thyssenkrupp Steel Europe, Duisburg ■ Dr.-Ing. Hans Bodo Lungen, Steel Institute VDEh, Düsseldorf ■ Dr. Robert Nightingale, Sydney ■ Prof. Dr.-Ing. Peter Schmöle, DPS Consulting, Dortmund ■ Univ.-Prof. Dr.-Ing. Dieter Senk, Department of Ferrous Metallurgy, RWTH Aachen University ■ Dr. Jens Traupe, Salzgitter AG, Salzgitter