



1st ESTAD & 31st JSI 7 - 8 APRIL 2014

FINAL PROGRAMME

Monday 7 April 2014	Tuesday 8 April 2014
09:30 Plenary Session	08:40 S 13: Sintering S 14: Continuous Casting 3 S 15: Hot Strip Mill 1 S 16: Steel Applications 1 S 17: Electric Arc Furnace 1 S 18: Energy 2
12:00 <i>Lunch</i>	
13:40 S 01: Ironmaking 1 S 02: Continuous Casting 1 S 03: Long Product Rolling S 04: Finishing & Coating 1 S 05: Secondary Steelmaking S 06: Stainless Applications	<i>Coffee break</i>
<i>Coffee break</i>	
16:00 S 07: Ironmaking 2 S 08: Continuous Casting 2 S 09: Energy 1 S 10: Finishing & Coating 2 16:20 S 11: DRI & HBI use S 12: Safety & Environment	10:40 S 19: Cokemaking S 20: Integrated Intelligent Manufacturing 1 S 21: Heavy Plate Mill S 22: Steel Applications 2 S 23: Electric Arc Furnace 2 11:00 S 24: Environment & By-products
18h00 <i>Cocktail</i>	12:30 <i>Lunch</i>
	13:40 S 25: Ironmaking 3 S 26: Oxygen Steelmaking S 27: Hot Strip Mill 2 S 28: Pickling & Cold Rolling S 29: Electric Arc Furnace 3 S 30: Integrated Intelligent Manufacturing 2
	16:00 <i>End of the conference</i>

Monday 7 April
9:30 Plenary session

Chairpersons: Ph. DARMAYAN (Fédération Française de l'Acier), France
C. LEROUGE (Ministère du Redressement Productif), France

Welcome address

Ph. DARMAYAN (Fédération Française de l'Acier), France

Opening address

C. LEROUGE (Ministère du Redressement Productif), France

Situation and challenges for the steel industry in Europe

H.J. KERKHOFF (Stahlinstitut VDEh, Wirtschaftsvereinigung Stahl, Düsseldorf), Germany

Global Steel Industry Perspective

F. BEKAERT (McKinsey & Company Anvers), Belgium

Steel's contribution to a low-carbon Europe 2050

P. DAHLMANN, J.T. GHENDA, H.B. LÜNGEN* (Stahlinstitut VDEh), T. SCHMIDT,
F. SCHULER, N. VOIGT, M. WÖRTLER (The Boston Consulting Group), Germany

Future with Steel

D. BHATTACHARJEE (Tata Steel R&D, IJmuiden), The Netherlands

Closing address

G. MOFFAT (Eurofer), Belgium

Monday 7 April
13:40 Session 01: Ironmaking 1

Chairpersons: E. HESS (ArcelorMittal Global R&D), France
H.B. LÜNGEN (VDEh), Germany

Keynote lecture

CO₂ mitigation limits for the hot metal production in the blast furnace - Phantasies versus reality

P. SCHMÖLE* (ThyssenKrupp Steel Europe, Duisburg), H.B. LÜNGEN (Stahlinstitut VDEh), Germany

Study of burden distribution behaviour through a reduced scale model

T. RABELO NUNES CAMPOS*, J. IEZZI (ArcelorMittal R&D Maizières), A. URVOY, P. AUBERT, J.L. EYMOND, G. LESOIN (ArcelorMittal Fos-sur-Mer), France, A. BIDOLI (Paul Wurth SA), Luxembourg

Implementation and Application of the acoustic top gas temperature measurement (SOMA) at No. 4 blast furnace of ROGESA in Dillingen

H. RAUSCH*, R. LIN, W. HARTIG (AG der Dillinger Hüttenwerke), Germany, M. TONTELING (Tapping Measuring Technology), Luxembourg, M. BRODECK (Bonnenberg + Drescher), Germany

Cu-staves cooled blast furnaces - The key for efficient operation and long campaign

J.P. SIMOES* (Paul Wurth SA), Luxembourg, C. CASTAGNOLA (Paul Wurth Italia), Italy

Determination of the feasibility of steel staves for the cooling of the blast furnace shaft

I. HERRERO BLANCO*, J. GONZÁLEZ OTERO, I. GONZÁLEZ BAQUET (ArcelorMittal Asturias), Spain, Y. DE LANGHE (ArcelorMittal FCE), Belgium

Shaft campaign extension, relining and blow-in of Fos-sur-Mer BF2

G. LESOIN*, J.L. REBOUL, H. SAQUIRE, A. URVOY, C. SAGE, C. HARTMANN, J.L. EYMOND (ArcelorMittal Fos-sur-Mer), France

* speaker

Monday 7 April

13:40 Session 02: Continuous Casting 1

Chairpersons: J.M. DAMASSE (Aperam R&D), France
P. GIBONDI (Ascométal), France

Model-based sticker detection in continuous casting

L. BAZART*, A. KHELASSI (ArcelorMittal R&D Maizières), D. MAQUIN (CRAN, Nancy),
B. BÈLE (ArcelorMittal R&D Maizières), J. RAGOT (CRAN, Nancy), A. MOUCHETTE
(ArcelorMittal R&D Maizières), France

Physical simulation of the flow in a full-scale water-model of a vertical twin-roll-strip caster

A. PELSS*, A. RÜCKERT, H. PFEIFER (RWTH Aachen), Germany

Reduction of slivers by use of an ElectroMagnetic Actuator

M. DE DONCKER*, A. DE PAEPE, S. DE VISSCHER, B. BRAEKEVELDT, P. VAN IMPE,
S. DE WILDE (ArcelorMittal Gent), Belgium, J.F. DOMGIN (ArcelorMittal R&D Maizières),
France

Recent developments of electro-magnetic actuators for continuous casting of long and flat products

S. KUNSTREICH*, T. GAUTREAU (Danieli Rotelec), France

New vertical bloom caster

F.G. WIMMER, A. EICHINGER*, H. THÖNE, P. PENNERSTORFER (Siemens VAI Metals
Technologies, Linz), Austria

Surface quality achievements at high casting speed in FTSC

S. BAF, M. FORNASIER* (Danieli, Buttrio), T. CIMARELLI (Vesuvius, Genova),
G. SCHIAVONE (Danieli, Buttrio), Italy

* speaker

Monday 7 April

13:40 Session 03: Long Product Rolling

Chairpersons: J.Y. VERNEDAL (Ascométal), France

S. SALENTINO (Siemens VAI Metals Technologies), Italy

Prevention of Scale Formation and Scale Conditioning by Diffusion-Inhibiting Coatings

M. SARTOR, T. REICHARDT* (VDEh-BFI) Germany

A new prediction model for void closure in hot metal forming

M. SABY* (form. Mines ParisTech CEMEF, now Ascométal R&D), G. BOI, J. DEMURGER (Ascométal R&D), M. BERNACKI, P.O. BOUCHARD (Mines ParisTech CEMEF), France

Modern processes and technologies for rail rolling

L. GIACOMINI*, A. LAINATI (Siemens VAI Metals Technologies, Marnate), Italy

Model development to improve the control of rail cooling during Continuous Head Hardened Rails (CHHR) process

B. POHU* (CRM Group, Gent), J. SMAL (CRM Group, Liège), Belgium, J. ARANCON, D. CARRASCAL (ArcelorMittal R&D Asturias), Spain

New Rolling Stands for Long Products Rolling Mills

M. TOMBA*, N. TOMBA, M. ZUCCATO, A. FONTANINI (PERT srl), Italy

Recent Developments in Laying Head Technology for High Speed Rod Rolling Mills

C. LASHUA, K. FIORUCCI (Siemens Industry Inc. Worcester), USA, L. GIACOMINI* (Siemens VAI Metals Technologies, Marnate), Italy

* speaker

Monday 7 April

13:40 Session 04: Finishing & Coating 1

Chairpersons: C. MARIQUE (CRM Liège), Belgium
F. GALDON (ArcelorMittal), France

Fully automatic skinpass at ArcelorMittal Gent

M. D'HONDT*, S. HUYLENBROECK, D. LOGGHE, K. LAUREYS (ArcelorMittal Gent), Belgium

On-line industrial waviness measurement for process control

G. MOREAS* (CRM Group, Liège), Belgium A. GARCIA MARTINO (ArcelorMittal R&D Asturias), Spain, E. MONTAGNA (Tata Steel Europe SEGAL), Belgium, W. BILSTEIN (Amepa Aachen), Germany

Optimization of the use of EMG-eMASS® - Review about joint studies realized by ArcelorMittal and EMG Automation GmbH

S. DOMBROWSKI, M. IRLE (EMG Automation), Germany, J. LEWIS (ArcelorMittal Cleveland), USA, A. CANO AVENDANO (ArcelorMittal Sagunto), Spain, S. COQUELIN, A. MOUCHETTE* (ArcelorMittal R&D Maizières), France

Enhanced software for hot roll profile modelling of continuous processing lines

F. CODE, C. PASQUINET, T. ROBIN* (Fives Stein), France

Lifetime increase of ArcelorMittal Mouzon HDG line equipments by thermo-mechanical modeling and specific measurements

J.J. LI*, H. SAINT-RAYMOND, J.P. LEBACQ, D. GLIJER (ArcelorMittal R&D Maizières), C. TRAN, J. NICOLAS, E. PETIT (ArcelorMittal Mouzon), France

Galvanising of High Strength Steel: the prominent role of the annealing atmosphere

L. BORDIGNON*, X. VANDEN EYNDE (CRM Group, Liège), Belgium

* speaker

Monday 7 April

13:40 Session 05: Secondary Steelmaking

Chairpersons: F. STOUVENOT (ArcelorMittal Global R&D), France
P. REISINGER (voestalpine Stahl), Austria

Hydraulic Converter Tilting improves availability of AOD

J.F. MULLER*, N. SOCQUET JUGLARD, (Ugitech, Ugine), G. LEMARQUAND (Université du Maine, Le Mans), France, L. EKSTRÖM, C. LUNDSTRÖM, P. VESTERBERG (UHT, Stockholm), Sweden

Monitoring ladle deslagging process after EAF tapping by online image analysis

B. PALM*, S. HAYN, H. KÖCHNER (VDEh-BFI), G. WEIDES, M. HAAS, G. THOMASSEN (Saarschmiede GmbH Freiformschmiede), Germany

Multi-criteria through-process optimization in Steelmaking Area: an on-line tool for integrated liquid steel temperature management

D. CASTIELLO*, F. MACCI (CSM Pomigliano d'Arco), M. MURRI (CSM Rome), A. PARIMBELLI (Lucchini Siderurgica, Piombino), Italy

Monitoring of temperature homogenisation in ladle furnace by continuous optical liquid steel temperature measurement

H. KÖCHNER*, T. KORDEL (VDEh-BFI), H. FISCHER (Minkon Sampler-Technik), Germany

Use of Yield Strength Index in the steelshop

R. SCHELSTRAETE*, B. GOMMERS, L. VAN DE PUTTE (ArcelorMittal Gent), Belgium

Recent Developments in Calcium Treatment in Steelmaking: a source of technical efficiency and cost-savings

M. SCHATZ*, S. GERARDIN, C. LENOIR (Affival), France

Evaluation of REM Inclusions and Clusters in Steel Samples Taken from Liquid Steel

H. SONE*, M. NABEEL, A. KARASEV, P. JÖNSSON (Royal Institute of Technology - KTH), Sweden

* speaker

Monday 7 April

13:40 Session 06: Stainless Applications

Chairperson: J. CHARLES (Aperam), Luxembourg

Potential developments of stainless steel in domestic water heating

L. FAIVRE* (Aperam R&D, Isbergues), J. LECLERCQ (Aperam Europe, Gueugnon), France

Cu-Alloying of 18CrNiMo7-6 for Increasing the Damage Tolerance of Gear Components

M.D. BAMBACH*, A. STIEBEN, W. BLECK (RWTH Aachen), Germany

Study on FATT in Stainless steel X20Cr13 for Turbine Blade Application

R. SU*, M. WANG, P. WU (Baosteel Special Steel, Shanghai), China

Mechanical Characterizations of Stainless Steel Tubes thanks to a Tube Bulging Test - Comparison & Validation of analytical models

A. BUTERI* (Aperam Europe Isbergues), N. BOUDEAU, J.KRESS, G. MICHEL, P. MALECOT (École Nat. Sup. Mécanique & Microtechniques, Besançon), France

* speaker

Monday 7 April
16:00 Session 07: Ironmaking 2

Chairperson: P. SCHMÖLE (ThyssenKrupp Steel Europe), Germany

Successful upgrade of the PCI facility leads to injection rates of above 240 kg/t_{HM} at ArcelorMittal Gent

A. DAELMAN*, F. VAN DE VELDE (ArcelorMittal Gent), Belgium, P. MAHOWALD, B. MULLER, (Paul Wurth SA), Luxembourg

Blast Furnace Technology with Pulsating Parameters

D. SENK (RWTH Aachen), R. KLOCK (form. RWTH Aachen, now ThyssenKrupp Steel Europe, Duisburg), A. BABICH*, H.W. GUDENAU (RWTH Aachen), Germany

Tuyere Phenomena Detection System

H. ZEWE, W. HARTIG (AG der Dillinger Hüttenwerke), Germany, J.P. SIMOES*, Y. REUTER, F. HANSEN, B. MULLER, P. VAN DORPE (Paul Wurth SA), Luxembourg

Research on the Thermal Damaged Mechanism of Baosteel Blast-Furnace Tuyere

Z. ZHANG*, S. WU, K. DU (Univ. of Science & Technology, Beijing), China

3D hearth wear model - Mathematical background and practical experiences

A. ALTENDORFER, E. FRANK*, T. KRONBERGER, M. SCHALER (Siemens VAI Metals Technologies, Linz), Austria

Endoscopy and Ceramic Welding: Suitable Tools for a Refractory Lining Preventive Maintenance of Hot Blast Stoves

J. TIRLOCQ* (Belgian Ceramic Research Centre), Belgium, O. DI LORETO (FIB Services International), Luxembourg

* speaker

Monday 7 April

16:00 Session 08: Continuous Casting 2

Chairpersons: JF. DOMGIN (ArcelorMittal Global R&D), France
M. BRUMMAYER (voestalpine Stahl), Austria

CC segment instrumentation & Process optimization to increase segments service lifetime in Dunkerque steelplant

N. TRIOLET*, O. MAFAITY, G. LANDTUYT (ArcelorMittal Dunkerque), K. CHERIF (ArcelorMittal Fos-sur-Mer), T. BRULLOT (ArcelorMittal R&D Maizières), A. DOMPER (SKF France), France, M. JOHANSSONN (SKF Sweden), Sweden

Improved slab assignment by optimizing caster scheduling with production management

E. CHAPUT* (ArcelorMittal Fos-sur-Mer), France, P. KNOOP, T. ROUBY (PSI Metals), Belgium

Slab width optimization by Dynamic Strand Spread Control (DSSC)

S. PETRY*, I. KNOPP, H.G. BRASS, D. SOBIECH, R. KRIEG (ThyssenKrupp Steel Europe, Duisburg), Germany

Production of API 5L grades in Danieli QSP thin slab rolling plants

M. GUAGNELLI*, P. BOBIG (Danieli Wean United, Buttrio), Italy

5.1 Mtpa High Quality Hot Strip - Two new ESP lines for China

A. JUNGBAUER* (Siemens VAI Metals Technologies, Linz), Austria

* speaker

Monday 7 April
16:00 Session 09: Energy 1

Chairpersons: J.P. BIRAT (ESTEP) Belgium
A. FLICK (Siemens VAI Metals Technologies), Austria

Energy Efficient Reheating at Special Steel Producers

J. VON SCHÉELE* (Linde India, Kolkata), V. BALASUBRAMANIAN (Kalyani Carpenter, Pune),
U. GUPTA (Mahindra Sanyo, Khopoli), India

Application of reheating furnace oxygen measurements to improve the furnace performance

T. DE RAAD*, J. BAUWENS, S. VAN HOECKE (ArcelorMittal Gent), Belgium

A new flat flame burner in combination with thermal regenerator (ROREBS) in reheating furnaces – experiences and perspectives

W. ADLER, W. BENDER* (VDEh-BFI), E. TSCHAPOWETZ (Andritz Maerz), Germany,
M. LOHNER (Böhler Edelstahl, Kapfenberg), Austria

Centralized regenerative burner system for non-oxidising furnaces

E. PINTO DE SOUSA*, L. FERRAND, P. DUBOIS, M. BRUNET (CMI Industry), France

Energy efficiency of heating processes with new ceramic high temperature recuperator

S. OTTO*, W. BENDER (VDEh-BFI), R. WEISS, A. LAUER (Schunk Kohlenstofftechnik),
A. LYNEN (Schunk Ingenieurkeramik), H. KOCH (Hülsenbusch Apparatebau), Germany

Dry Slag Granulation with Energy Recovery: From Inception to Pilot Plant

H. KAPPES, D. MICHELS* (Paul Wurth SA), Luxembourg

* speaker

Monday 7 April

16:00 Session 10: Finishing & Coating 2

Chairperson: E. GAILLY (ArcelorMittal Europe), Belgium

Ultra Dry Cooling: Rapid cooling of steel strips in continuous process by spraying a hydrocarbon

M. ZOGHAIB, L. FERRAND*, P. DUBOIS (CMI, Avon), M. NEMER (Mines ParisTech, Palaiseau), France

Fives Stein Level 2, a step forward in "Taylor-made" Furnace Level 2 for processing lines

T. ROBIN* (Fives Stein Maisons-Alfort), France

Opportunity to use ultra rapid annealing heat treatments on steels: metallurgical and practical aspects

V. MASSARDIER*, D. FABRÈGUE (INSA Lyon), E. MAGADOUX (Fives Stein), E. PATARD (Fives Celes), France

Infrared Sensing Technology for Online Measurement of Organic Coatings

C. BURNETT (Thermo Fisher Scientific, Wilmington), USA, B. HARAND, D. BERG* (Thermo Fisher Scientific, Erlangen), Germany, G. OSMONT (Thermo Fisher Scientific, Courtabœuf), France

The New Paradigm of Surface Inspection to Support Quality Decisions in Flat Steel Production

S. BURKHARDT, M. HOENEN* (Isra Vision Parsytec), Germany

Reliable and consolidated measurement data: a challenge for big data and data mining performances and efficiency, application to finishing lines

J.B. LEGER*, M. MONNIN (PREDICT, Nancy), P.J. KRAUTH, A. MOUCHETTE, F. LAWAYEB (ArcelorMittal R&D Maizières), G. GROUSSIER (ArcelorMittal Florange), France

* speaker

Monday 7 April

16:20 Session 11: DRI & HBI use

Chairperson: P. DAHLMANN (VDEh), Germany

Temperature based DRI feeding in electric arc furnaces

M. ANDERSSON*, K. KRÜGER (Helmut Schmidt University, Hamburg), U. BRAUN,
A. JÜCHTER (ArcelorMittal Hamburg), Germany

EAFs towards 100% HBI charge

M. VOLPE*, S. PREDI (SMS Concast Italia), Italy, M.D. BUCKENTIN (Solb Steel, Jizan
Plant), Kingdom of Saudi Arabia

**On-line implementation of a dynamic process model for an electric arc furnace with
continuous DRI charging**

C. OJEDA*, P. NYSSSEN (CRM Group, Liège), Belgium, F. LÓPEZ, R. LULE, C. CHACÓN,
J. MENDOZA, R. WARMBOLD, J.F. GONZÁLEZ (ArcelorMittal Lázaro Cárdenas), Mexico,
J.C. THIBAUT, J.C. BAUMERT (ArcelorMittal R&D Esch-sur-Alzette), Luxembourg, M. LOWRY
(ArcelorMittal R&D East Chicago), USA

Jet Process for highest scrap and DRI rates in converter

G. WIMMER*, K. PASTUCHA, J. KLUGE, A. FLEISCHANDERL, J. SPIESS (Siemens VAI Metals
Technologies, Linz), Austria

**Increased scrap rate to the BOF process by application of hot air post combustion –
PS-BOP project**

C. GÜNTHER*, M. WAHL, M. BONENBERGER, C. AMES, D. SCHMIDT (Saarstahl AG),
Germany, H.S. CHOI, C.S. HA, J.H. CHOI, D.Y. SHIN, B.I. AHN, B.H. CHOI, D.J. KIM
(POSCO, Pohang), Korea

* speaker

Monday 7 April

16:20 Session 12: Safety & Environment

Chairperson: A. PONS-RENOUF (Eramet), France

Safety made visible: progress through the "100% Safe" Areas

E. HATON, F. BADIA RAPOSO* (ArcelorMittal Sagunto), Spain

A nearly never ending story: Our plant - My safety

H.G. RANDEL*, N. KÖLKER, T. KURZ, H. SCHLIEPHAKE, F. OSTERHEIDER
(Georgsmarienhütte GmbH), Germany

Assessment of emissions and impact of steel production processes

D. CIAPARRA* & Tata Steel ASEMIS Team (Tata Steel Europe R, D & T Swinden), United Kingdom, F. DREWNICK & MPI for Chemistry ASEMIS Team (MPI for Chemistry), Germany, B. GONZALEZ (ArcelorMittal R&D Asturias), Spain, S.M. GARCIA (Insituto de Soldadura e Qualidade), S.M. ALMEIDA (Instituto Tecnológico e Nuclear), Portugal

Advanced Dry Gas Cleaning for Iron- and Steelmaking

R. NEUHOLD*, A. FLEISCHANDERL, I. KOFLER, T. PLATTNER (Siemens VAI Metals Technologies, Linz), Austria

* speaker

Tuesday 8 April
08:40 Session 13: Sintering

Chairperson: L. PIEZANOWSKI (Paul Wurth SA), Luxembourg

Improved sinter mix preparation while using challenging materials (IMSIMI RFCS funded project)

E. PIRARD, M. EVRARD (Université de Liège), Belgium, R. PIETRUCK (VDEh-BFI), Germany, F. VAN LOO*, C. MATHY, J.C. PIERRET, V. PIRET (CRM Group, Liège), Belgium

Improvement of sinter raw materials preparation by intensive mixer to cope with the use of high level of fine iron ores

M. LIMA, J.P. TERES, J.F. DOUCE* (ArcelorMittal R&D Maizières), France, W. LUMEN, F. VAN DE VELDE (ArcelorMittal Gent), J.C. PIERRET, F. VAN LOO (CRM Group, Liège), Belgium, L. PIEZANOWSKI (Paul Wurth SA), Luxembourg

Modeling of energy consumption in integrated steelmaking with respect to ferrous raw material selection

L. HOOEY*, J. RIESBECK, J.O. WIKSTRÖM (MEFOS Luleå), B. BJÖRKMAN (University of Technology, Luleå), Sweden

Development of Gas Fuel Injection Technology in Iron Ore Sintering Process

T. HIGUCHI, N. OYAMA, T. YAMAMOTO, Y. IWAMI* (JFE Steel, Steel Research Lab.), N. TAKEUCHI (JFE Steel, Fukuyama), Y. TAKIGAWA (JFE Steel, Kurashiki), K. TAMURA (JFE Steel, Keihin), Japan

De-oiling of oily mill sludge and scales

M. PELLETIER (Lhoist R&D, Nivelles), Belgium, D. RODRIGUEZ*, M. HOUBART (Paul Wurth SA), Luxembourg

* speaker

Tuesday 8 April

08:40 Session 14: Continuous Casting 3

Chairperson: M. LARRECQ (Ascométal), France

A Study on Production of Defect Free High Tensile Steel for Wheel Rim Application

T.K. ROY*, V.V. MAHASHABDE (Tata Steel, Jamshedpur), India

IMC-B - A new experimental method to predict the crack susceptibility under continuous casting conditions

P. KRAJEWSKI*, C. BERNHARD, R. KROBATH (Montanuniversität Leoben), T. SCHADEN (Siemens VAI Metals Technologies, Linz), S. ILIE (voestalpine Stahl, Linz), Austria, S. LOUHENKILPI (Aalto University), Finland

Behaviour of Boron and Manganese in Nb-V-Ti Microalloyed Steels for Continuous Casting

T. BRUNE*, D. SENK (RWTH Aachen), Germany, G. de TOLEDO (Gerdau I+D Europa), Spain, J. KOMENDA, K. FRISK (KIMAB, Stockholm), Sweden, A. SMITH (Tata Steel Europe R, D & T Teesside), United Kingdom

Hot tearing prediction during slab continuous casting of steel through thermomechanical simulation

B. RIVAUX*, M. BOBADILLA (ArcelorMittal R&D Maizières), K. CHERIF (ArcelorMittal Fos-sur-Mer), France

Development of a Large Ingot Continuous Caster (LICC)

K.S. OH*, J.D. LEE, S.J. KIM, G. SHIN (POSCO), Korea

* speaker

Tuesday 8 April
08:40 Session 15: Hot Strip Mill 1

Chairperson: V. WUYCKENS (NLMK Europe), Belgium

Reduction of NO_x Emission and Gas Consumption at Walking Beam Furnace by adjustments to the existing Side Burners

N. NAUMANN*, T. SPECHT, S. LÜDEMANN, R.P. BÖSLER (ArcelorMittal Eisenhüttenstadt) Germany

Advanced Model Predictive Control "MPC" for steel reheating furnace: performance improvement and energy savings

X.M. NGUYEN (Supélec Gif-sur-Yvette & ArcelorMittal R&D), F. LAWAYEB, A. MOUCHETTE* (ArcelorMittal R&D Maizières), France

Enhanced accuracy of descaling nozzle arrangements with new, complementary measurement methods

J. FRICK* (Lechler, Metzingen), Germany

Replacement of two complete electrical and mechanical main drives of finishing stands in one outage of 14 days

G. DE ZUTTER*, K. HAVERBEKE (ArcelorMittal Gent), Belgium

Drive train modernization at ArcelorMittal Dunkerque - Study, implementation and results of a hot strip mill revamp

P. BEAUVAIS, S. TEUF (ArcelorMittal Dunkerque), France, G. HANSBERG, S. BERGER, K. HOEN* (SMS Siemag AG, Hilchenbach), Germany

* speaker

Tuesday 8 April

08:40 Session 16: Steel Applications 1

Chairperson: B. HRIBERNIK (ASMET), Austria

Steel ab initio – New methods for the Design of High Strength Cold Formable Steels

W. BLECK* (RWTH Aachen), Germany

Defect tracking: an innovative solution as supporter of Automotive zero defect vision. Win-Win for steel producer and Automotive customer

M. DUNAND* (ArcelorMittal Flat Carbon Europe), France, U. HEIDTMANN (ThyssenKrupp Steel Europe, Duisburg), Germany, M. WILCKE (TATA Steel Europe, IJmuiden), The Netherlands

Local approach to interfacial fracture of resistance spot welds of automotive steels

A.F. GOURGUES-LORENZON* (École Nat. Sup. des Mines, Evry), F. KRAJCARZ (Aperam R&D, Isbergues), E. LUCAS (ArcelorMittal R&D Maizières), A. PINEAU (École Nat. Sup. des Mines, Evry), France

Corrosion mechanisms of ZnMgAl coated steels in natural environments

M. SALGUEIRO AZEVEDO*, C. ALLÉLY, M. MONNOYER (ArcelorMittal R&D Maizières), France, C. DIEU (ArcelorMittal R&D Liège) Belgium, P. VOLOVITCH, K. OGLE (École Nat. Sup. de Chimie, Paris), France

* speaker

Tuesday 8 April

08:40 Session 17: Electric Arc Furnace 1

Chairperson: C. DWORATZEK (Vallourec), France

Recycling of solid residues in melting furnaces

M. DORMANN*, V. PIRET, B. VANDERHEYDEN (CRM Group, Liège), A. COTTON,
A. D'ALFONSO (Aperam Europe Châtelet), P.F. BAREEL (Comet Traitements, Châtelet),
Belgium

Two steps to Zero Waste: Ladle furnace slag stabilisation and recycling in EAF

H. SCHLIEPHAKE, B. DETTMER, K. SCHULBERT, T. ZEHN, T. REKERSDREES*
(Georgsmarienhütte GmbH), P. DRISSEN, D. MUDERSBACH (FEhS, Duisburg), Germany

EFER - EAF Fume Energy Recovery

P. FRITTELLA, E. MALFA, A. VENTURA, F. CIRILLI* (CSM Dalmine), N. MONTI (Tenova
Milan), A. CORRÀ (TenarisDalmine), Italy

Increase of the de-dusting capacity on ASCOMETAL Hagondange EAF

B. MERLIN*, P. LEHEMBRE (Ascométal Hagondange), L. PERRUCHOT (Ascométal Les
Dunes), M. LARRECQ (Ascométal Head Office), P. ROMELLOT (Air Conseils & Ingénierie
Environnement), P. SPRUNK (Cotumer, Woippy), France

**Investigation of briquettes used for combined slag foaming and waste recycling in
the EAF stainless steelmaking**

A. DAVYDENKO* (Royal Institute of Technology - KTH), S. MOSTAFAEE (Ovako Hofors),
A. KARASEV, P. JÖNSSON (Royal Institute of Technology - KTH), Sweden

* speaker

Tuesday 8 April
08:40 Session 18: Energy 2

Chairpersons: B. HEBEISEN (Aperam) Luxembourg
J. DUCLOS (GDF SUEZ) France

Generating added value to steel mill off-gases

A. FLEISCHANDERL, R. NEUHOLD*, T. PLATTNER (Siemens VAI Metals Technologies, Linz), Austria, P. NAIR (LanzaTech, Roselle), USA

Minimizing gas flares with mill wide energy optimization system at ArcelorMittal integrated steel mill

J. KARJALAINEN (ABB Oy), Finland, B. CHEMINAT*, C. PAUMARD, J.M. GABRIEL (ArcelorMittal Fos-sur-Mer), France

Reduction of energy consumption on a Hot Dip Galvanizing line thanks to streams integration based on Pinch Analysis

M. VIART* (ArcelorMittal R&D Maizières), A. RICHARD (ArcelorMittal Florange), V. WEBER (ArcelorMittal R&D Maizières), France

Energy efficiency thanks to synthetic lubricants Mobil SHC

M. FERNANDEZ*, O. MARECHAL* (ExxonMobil Fuels & Lubricants), France

X-Pact® Energy Advisor: More effective production with reduced energy consumption

A. HOFMANN, D. EHLERT, R. KÜLCHEN, J. MELLENTHIN* (SMS Siemag AG Düsseldorf), Germany

Energize Project - Overall Energy Efficiency Program for ArcelorMittal European Plants - Flat segment

V. CHIPER*, L. FROMM, P. RAVAUX, T. MARQUAIS, M. BEN HASSINE, R. SERGEANT (ArcelorMittal Flat Carbon Europe), Europe

* speaker

Tuesday 8 April
10:40 Session 19: Cokemaking

Chairperson: D. ISLER (Centre de Pyrolyse de Marienau), France

Advanced methods to understand coal swelling pressure phenomena during coking

T. ROZHKOVA*, D. ISLER (Centre de Pyrolyse, Marienau), France

The continuous measurement of coke cake level by microwave level sensor during coke cake pushing

T. MATSUI*, K. TERUI (JFE Steel, Steel Research Lab.), M. SHINOHARA (JFE Steel, Kurashiki), H. TAKEDA (JFE Steel, Chiba), M. NAGAYAMA, Y. DOHI, K. FUKADA (JFE Steel, Steel Research Lab.), Japan

Installation of the Pressure Regulated Oven (PROven) system at existing coke plants – an effective measure for the reduction of coke oven emissions

F. HUHN, F. KREBBER, J. KÜHN-GAJDZIK*, K. ÜBERSCHÄR (ThyssenKrupp Industrial Solutions, Dortmund), Germany

Assessment of regenerator conditions using new inspection devices

F. THOMANN* (ArcelorMittal Dunkerque), France

Reduction of emissions of coke ovens: FIBS International current results

J. TIRLOCQ* (Belgian Ceramic Research Centre), Belgium, O. DI LORETO (FIB Services International), Luxembourg

* speaker

Tuesday 8 April

10:40 Session 20: Integrated Intelligent Manufacturing 1

Chairperson: H. PETERS (VDEh-BFI), Germany

Keynote lecture

The Integrated Intelligent Manufacturing approach for a sustainable, safe and profitable steel industry in Europe

M. BRUMMAYER (voestalpine Stahl Linz), Austria, L. CHEFNEUX (ArcelorMittal Global R&D), Belgium, V. COLLA (Scuola Superiore Santa Anna, Pisa) Italy, N. GOLDENBERG (Siemens AG Erlangen), Germany, G. KUIPERS (Tata Steel Europe), The Netherlands, G. MATHIS (ArcelorMittal Global R&D), France, S. MOUTON (CETIC, Charleroi), Belgium, H. PETERS (VDEh-BFI), Germany, C. PIETROSANTI* (CSM Rome), Italy

SIMETAL Condition Monitoring System - Integrative monitoring for mechanics, automation and processes

A. HASCHKE* (Siemens AG Erlangen), Germany

An experience of plant control using Operator Independent Technology at RIVA Group

L.M. GALASSO*, M. OMETTO (Danieli Automation, Buttrio), Italy

Semantic Modeling Approach for the Steel Production Domain

S. ZILLNER* (Siemens AG Munich), A. EBEL (VDEh-BFI), M. SCHNEIDER, L. ABELE (Siemens AG Munich), Germany, G. MATHIS (ArcelorMittal Global R&D), France, N. GOLDENBERG (Siemens AG Erlangen), Germany

Statistical Process Control in the Hot Rolling Mill and Cold Rolling Mill in ArcelorMittal Poland

S. CHAIEB*, M. SZCZERBA, B. NIEMCZYK, M. SZELAŹEK (ArcelorMittal Kraków), Poland

* speaker

Tuesday 8 April

10:40 Session 21: Heavy Plate Mill

Chairpersons: S. JIAO (Baosteel Research Institute, Shanghai), China
L. IRASTORZA (Dillinger France)

Condition Monitoring of Electro-Hydraulic Valves in a Rolling Mill

A. STEINBOECK, W. KEMMETMÜLLER, C. LASSL, A. KUGI, (Technical University of Vienna), Austria, M. JOCHUM*, T. KIEFER (AG der Dillinger Hüttenwerke), Germany

Europe's most modern heavy-plate mill stand - Technological highlights and revamp concept of the heavy-plate mill modernization at NLMK DanSteel

A. THOMASEN*, Y. BOKACHEV (NLMK DanSteel, Frederiksværk), Denmark, A. KLEIN, S. JÄNICKE, G. HORN (SMS Siemag AG, Hilchenbach), Germany

Fast and accurate force prediction for high quality heavy plates by a state of the art rolling model calibrated from mill data via inverse techniques

J. LOHMAR*, M. BAMBACH, G. HIRT (RWTH Aachen), T. KIEFER, D. KOTLIBA, M. JOCHUM, S. SEUREN (AG der Dillinger Hüttenwerke), Germany

Direct Heat Treatment Process for Microstructure Control of High Strength Plate Steels

S. JIAO*, A. ZHANG, Q. ZHANG (Baosteel Research Institute, Shanghai), China

Effects of surface conditions on spray cooling characteristics

H. FUKUDA*, N. NAKATA, H. KIJIMA, T. KUROKI, A. FUJIBAYASHI (JFE Steel, Steel Research Lab.), Y. TAKATA, S. HIDAKA (Kyushu University), Japan

* speaker

Tuesday 8 April

10:40 Session 22: Steel Applications 2

Chairperson: F. MUDRY (IRT Matériaux, Métallurgie & Procédés), France

Quantitative characterization of bainitic microstructures for determination of parameters controlling impact toughness

V. BORDEREAU*, A.F. GOURGUES-LORENZON (Mines ParisTech, Evry), M.T. PERROT-SIMONETTA (ArcelorMittal R&D Gandrange), K. ZHU (ArcelorMittal R&D Maizières), France

Continuously cooled bainitic steels with improved machinability

H. ROELOFS* (Swiss Steel AG, Emmenbrücke), M. LEMBKE (Steeltec AG, Emmenbrücke), J. BOOS (Inspire AG, Zürich), D. SMOLENICKI, F. KUSTER (Eidgenössische Technische Hochschule Zürich), Switzerland

Forging steels with carbide free bainite for high service fatigue life properties

V. WIRTHS*, W. BLECK (RWTH Aachen), R. WAGENER, T. MELZ (Fraunhofer Institute, Darmstadt), Germany

* speaker

Tuesday 8 April

10:40 Session 23: Electric Arc Furnace 2

Chairperson: H. SCHLIEPHAKE (Georgsmarienhütte), Germany

Improved EAF & AOD performance by Low Liquidus FeCr

K. BESKOW*, C.J. RICK, P. VESTERBERG (UHT, Kista), Sweden

Continuous improvement of the EAF-Process - Operational trials for optimisation at Badische

A. OPFERMANN* (Badische Technology and Service), A. GROSSE, L. HACQUARD (Badische Stahl-Engineering), S. WOHLFAHRT (Badische Stahlwerke), Germany

Modelling and Simulation of the transient Electric Arc Furnace process

T. MEIER*, A. HASSANNIA KOLAGAR, T. ECHTERHOF, H. PFEIFER (RWTH Aachen), Germany, V. LOGAR, I. ŠKRJANC (University of Ljubljana), Slovenia

Technological Controls for AC-EAFs - Latest Developments and Results

G. GILLEN, D. BRISSON (Nucor, Crawfordsville), USA, B. DITTMER*, A. DÖBBELER, T. MATSCHULLAT (Siemens AG Erlangen), D. RIEGER (Siemens AG Munich), K. KRÜGER (Helmut Schmidt University, Hamburg), Germany

Through-process control strategies for reliable achievement of liquid steel quality and temperature aims within the electric steelmaking route

M. SCHLAUTMANN*, B. KLEIMT (VDEh-BFI), V. ZAGREBIN (Peiner Träger), H.J. PONTEN (PSI Metals), Germany

* speaker

Tuesday 8 April

11:00 Session 24: Environment & By-products

Chairperson: G. NILSON (Jernkontoret), Sweden

Application of FeMn Slag and MgO Reduction Waste into BOF

C.H. KEUM*, W. KIM, S.M. SEO, J.H. CHOI (POSCO Technical Research Labs), T.G. KIM (POSCO Pohang Works), Korea

BOF Converter Slag Valorization

H. WULFERT (Loesche, Düsseldorf), Germany, A. FLEISCHANDERL, G. WIMMER*, A. WERNER, T. FENZL, J. KLUGE (Siemens VAI Metals Technologies, Linz), Austria

Recycling Fe from BOF slag: the latest advances

J. POIRIER*, G. THEVENIN, (CEMHTI, Orléans), D. POIRIER, M. GOTELIP BARBOSA, W. XUAN (ArcelorMittal R&D Maizières), D. BULTEEL (École Nat. Sup. Mines Douai), France

Innovative Waste Heat Recovery Solutions

D. BETTINGER, G. ENICKL* (Siemens VAI Metals Technologies, Linz), Austria

* speaker

Tuesday 8 April
13:40 Session 25: Ironmaking 3

Chairpersons: J. SCHENK (Montan Universität Leoben), Austria
A. BABICH (RWTH Aachen), Germany

SAIL RSP Blast Furnace No. 5: a Greenfield Project in a Brownfield Optimization Context

J. BAK*, E. ENGEL (Danieli Corus, Ijmuiden), The Netherlands

Application of the process optimization system for blast furnaces at Ternium Siderar's blast furnace #2 for high efficiency operation

O. LINGIARDI, G. GEGNA, G. TOMASSINI, C. QUISPE (Ternium Siderar San Nicolas), Argentina, E. FRANK*, M. SCHALER, B. SCHÜRZ (Siemens VAI Metals Technologies, Linz), Austria

On-line measurement of the hot metal temperature and composition in the blast furnace runners by Laser Induced Breakdown Spectroscopy (LIBS)

G. MONFORT*, L. BELLAVIA (CRM Group, Liège), Belgium, M. TONTELING (Tapping Measuring Technology), Luxembourg, C. OJEDA, O. ANSSEAU (CRM Group, Liège), Belgium

Reducibility of a Hematitic Lump Ore at different near Blast Furnace Conditions

M.B. HANEL*, H. MALI, J. SCHENK (Montanuniversität Leoben), F. HAUZENBERGER (Siemens VAI Metals Technologies, Linz), C. THALER (voestalpine Stahl, Linz), H. STOCKER (voestalpine Stahl, Donawitz), Austria

Reduction Behaviour of Iron Ore Agglomerates Using Coke Oven Gas

E. MOUSA*, A. BABICH, D. SENK (RWTH Aachen), Germany

Process behaviour of fine iron ores during reduction in a fluidized bed reactor and characterization of morphological evolution

A. PICHLER*, H. MALI, J.L. SCHENK, M. SKORIANZ (Montanuniversität Leoben), J.F. PLAUL, B. WEISS (Siemens VAI Metals Technologies, Linz), Austria

Characterization and assessment of lump COREX® chars under various process conditions

A. BHATTACHARYYA*, J. SCHENK, G. RANTITSCH (Montanuniversität Leoben), H. HECKMANN (Siemens VAI Metals Technologies, Linz), Austria

* speaker

Tuesday 8 April

13:40 Session 26: Oxygen Steelmaking

Chairpersons: C. DE MARÉ (ArcelorMittal Europe), Belgium
R. FANDRICH (VDEh), Germany

Innovations and improvements on BOF converter automation

S. HOFINGER*, I. MÜLLEDER, H. KÜHBÖCK, M. HIEBLER (Siemens VAI Metals Technologies, Linz), Austria

Development and evaluation of a new dynamic BOF model close to industrial Practice

D. SCHÖNE*, H. LACHMUND, N. BANNENBERG (AG der Dillinger Hüttenwerke), D. SENK (RWTH Aachen), Germany

SMS Siemag BOF process model: Stable and optimized performance under suboptimal conditions

A. HOFMANN, J. REICHEL, S. LOGINOV, J. MELLENTHIN* (SMS Siemag AG Düsseldorf), Germany, S. DAS (SMS India Pvt. Ltd., Gurgaon), India

Yield improvement of BOF at ArcelorMittal Ghent

S. BEECKMANS*, L. VAN DE PUTTE, C. VERCRUYSSSEN, J. QUEECKERS, A. ROOSENS (ArcelorMittal Ghent), Belgium

An analysis of a converter based on modelling

X. ZHOU*, M. ERSSON, P. JÖNSSON (Royal Institute of Technology - KTH), Sweden

Latest developments on the refractory lining of BOF's

T. SCHEMMEL*, R. GUESGEN (Refratechnik Steel, Düsseldorf), Germany

* speaker

Tuesday 8 April

13:40 Session 27: Hot Strip Mill 2

Chairpersons: G. LANNOO (CRM Gent), Belgium
T. REICHARDT (VDEh-BFI) Germany

Trends in Hot Rolling

J. MAIERL, A. JUNGBAUER*, R. KARL (Siemens VAI Metals Technologies, Linz), Austria

Roll gap lubrication performance analysis in hot rolling conditions

B. VERVAET* (CRM Group, Gent), K. VERHIEST, P. VAN POECKE (ArcelorMittal Gent), Belgium, C. GHIBAUDO (ArcelorMittal R&D Maizières), France, V. MASAGUER TORRES (ArcelorMittal Avilés), Spain, C. PELLETIER (Tata Steel Europe R, D & T IJmuiden), The Netherlands

Optimization of strip over width in Ruukki's hot rolling mill

J. JOKISAARI*, A. KUJANPÄÄ (Ruukki Metals, Raahе), I. JUUTILAINEN, J. RÖNING (University of Oulu), Finland

E-STRIPCAM: through process model for microstructural evolution and energy consumption in hot strip rolling

H. UIJTDEBROEKS*, J. SMAL (CRM Group, Liège), Belgium, J.R. GONZÁLEZ SUÁREZ (ArcelorMittal Asturias), G. ALONSO-ORCAJO, F. BRIZ (Universidad de Oviedo), Spain, D. ZANDER, T. REICHARDT (VDEh-BFI) Germany

Process model for hot rolling mills - predicting and controlling product properties

D. EHLERT*, O. JEPSEN, G. SCHNEIDER (SMS Siemag AG Hilchenbach), Germany

On-line evaluation of work roll degradation in hot rolling mills

J. MALBRANCKE, H. UIJTDEBROEKS*, G. MOREAS (CRM Group, Liège), Belgium, C. FEDORCIUC-ONISA (Tata Steel Europe R, D & T Swinden), United Kingdom

Technology based production planning assistance system for Hot Strip Mill

M. LUPINELLI, D. CASTIELLO* (CSM Terni), L. ONOFRI (Acciai Speciali Terni), Italy

* speaker

Tuesday 8 April

13:40 Session 28: Pickling & Cold Rolling

Chairperson: C. BONAUD (Danieli), France

Optimisation of the pickling line productivity by on-line pickling state measurement

T. JACQUOT*, J.P. LEBACQ (ArcelorMittal R&D Maizières), France, A. KOHTALA, M. KURTH (SR-Instrument Oy), Finland, Y. GREDAY, F. COUNET (ArcelorMittal Liège), Belgium

Novel laboratory lubrication tests for cold rolling emulsions

J.B.A.F. SMEULDERS* (Quaker Chemical), The Netherlands

Energy saving by installation of new lubrication technology on tandem mill (TFL - Thin Film Lubrication)

A. MÜLLER*, M. KRÜGER, T. SAFFER, F. FABIAN, V. REGER, H. KOTHE (ArcelorMittal Eisenhüttenstadt), B. STAES (Henkel AG), Germany

Industrial sensor able to detect on-line roll marks at the ArcelorMittal Sagunto cold rolling mill exit

T. JACQUOT*, G. FRICOUT (ArcelorMittal R&D Maizières), France, S. PYÖRRET, M. KURTH (SR-Instruments Oy), Finland, J.L. GARCIA FERNANDEZ, D. LOPEZ (ArcelorMittal Sagunto), Spain

Modernization of Avilés tinplate tandem mill CRM2: production increase from 540 kt to 715 kt per year and speed increase from 1560 to 2180 m/min

A. CORIHUELA, I. ALVAREZ (ArcelorMittal Avilés), Spain, F. DUMORTIER* (CMI, Seraing), Belgium

Modernization of inline skin pass mill to meet demand of advanced steel grades at CAL of ThyssenKrupp Steel Europe in Dortmund

M. BLUMENAU, U. ZOCHER (ThyssenKrupp Steel Europe, Dortmund), A. GRAMER*, D. MATHWEIS, R. SCHLOTE (SMS Siemag AG Düsseldorf), Germany

* speaker

Tuesday 8 April

13:40 Session 29: Electric Arc Furnace 3

Chairperson: B. KLEIMT (VDEh-BFI), Germany

Advised refractory solution for the electric arc furnace

P. TASSOT*, C. WILLOUGHBY (Calderys, Neuwied), Germany

An approach to reduce the thermal losses in an EAF

T. DEINET*, C. DANNERT (Forschungsgemeinschaft Feuerfest), P. TASSOT (Calderys, Neuwied), H. SCHLIEPHAKE, B. DETTMER (Georgsmarienhütte GmbH), Germany

Formulated Lime (Flucal® Jet) co-injected or not with oxygen into Electric Arc Furnace fed with solid and liquid pig iron in ArcelorMittal Cariacica and Juiz de Fora (Brazil)

B. PINHEIRO* (ArcelorMittal Juiz de Fora), M. ALMEIDA* (ArcelorMittal Cariacica), M.A. de MENIBUS, P. BARTOLOMEO, P. NICACIO (Belocal Lhoist do Brazil), Brazil, E. PERRIN (Lhoist Nivelles), Belgium

Enhanced plug stirring policies for electric arc furnace bath homogenisation

F. CIRILLI*, M. DE SANTIS (CSM Rome), Italy, S. FERRO, J. COPOLA (Tenaris), Argentina

Increasing EAF energy efficiency by bottom gas purging

M. KIRSCHEN*, J. BACHMAYER, K.M. ZETTL (RHI AG, Vienna), Austria

Use of char coal from biomass in EAF

F. CIRILLI*, L. DI SANTE (CSM Rome), P. FRITTELLA (CSM Dalmine), S. TOSATO, F. PRAOLINI, P. TRAINI, P. GALBIATI (TenarisDalmine), Italy

Biochar Usage in EAF-Steelmaking - Potential and Feasibility

T. DEMUS*, T. REICHEL, T. ECHTERHOF, H. PFEIFER (RWTH Aachen), Germany

* speaker

Tuesday 8 April

13:40 Session 30: Integrated Intelligent Manufacturing 2

Chairpersons: L. CHEFNEUX (ArcelorMittal Global R&D), Belgium
C. PIETROSANTI (CSM Rome), Italy

Experience and evolution - 10 years of robotics in continuous casting technology

J. MEISEL, A. EICHINGER*, S. PFEIL, R. SCHEIDEGGER, M. HÜGEL, G. PRINZ, A. PRIESNER
(Siemens VAI Metals Technologies, Linz), Austria

Challenges in material flow accounting - Case Study iron production process

V. TRINKEL*, O. CENCIC, H. RECHBERGER, J. FELLNER (Vienna University of Technology),
N. KIEBERGER, T. BÜRGLER (voestalpine Stahl), Austria

Knowledge based decision support system for slabs approval at the steel shop

A. EBEL*, N. LINK (VDEh-BFI), Germany

From continuous casting to rolling process simulation with a full 3D powerful software tool

O. JAOUEN*, F. COSTES, M. BARBELET, P. LASNE (Transvalor), France

On line electromagnetic inspection of steel microstructure during hot processing

A.J. PEYTON* (Univ. of Manchester), C.L. DAVIS (Univ. of Birmingham), P.F. MORRIS
(Consultant), F.D. VAN DEN BERG (Tata Steel), P. HUNT (Siemens VAI Metals
Technologies), United Kingdom

Surface quality supervision by means of automatic inspection data

J. BRANDENBURGER* (VDEh-BFI), C. SCHIRM, M. NÖRTERSHEUSER (ThyssenKrupp
Rasselstein), Germany

* speaker