

Euroslag 2015

The 8th European Slag Conference

Conference Program, October 21–23, 2015



EUROSLAG

voestalpine

ONE STEP AHEAD.

Wednesday, October 21, 2015

8:00 – 9:30 am	Conference registration	
9:30 – 9:40	Conference related issues	S. Lackner, Austria voestalpine Stahl GmbH
9:40 – 9:50	Welcome by voestalpine	W. Neubauer, Austria Managing director, voestalpine Stahl GmbH
9:50 – 10:00	Opening by the Chairman	H. Motz, Germany EUROSLAG, The European Slag Association, Duisburg

Topic 1: Legal and Standardization Issues (Room A)
(Chairman: **Claus Geiger**, voestalpine Stahl GmbH)

10:00 – 10:15	Release of dangerous substances from construction products into soil and ground-water – a status report on tests methods developed by CEN/TC 351/WG1	U. Wiens, Germany German Committee for Structural Concrete, Berlin
10:15 – 10:30	Resource efficiency and environmental protection: are we losing track of sustainability?	G. Endemann, Germany Steel Institute VDEh, Düsseldorf
10:30 – 10:45	How environmentally compatible is steel slag? Applications to be benchmarked	H. Schuster, Austria Greenpeace Austria
10:45 – 11:00	The new Austrian ordinance on recycling of aggregates with emphasis on steel slags: a status report	J. Kraus, Austria Federal Ministry of Agriculture, Forestry, Environment and Water Management, Vienna
11:00 – 11:15 am	Using steel slag aggregate in road construction: a field report	T. Hittler, Austria Teerag Asdag

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Room A, Topic 1

11:15 – noon Round table discussion

G. Endemann, Germany
Steel Institute VDEh,
Düsseldorf
J. Kobler, Austria
Government Upper-Austria
H. Schuster, Austria
Greenpeace
T. Hittler, Austria
Teerag Asdag
J. Prammer, Austria
voestalpine AG

noon – 1:00 pm Lunch

**Topic 2a: Research and Development (Room A) –
Treatment of Slags (Chairman: Hans Kobesen)**

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1:00 – 1:15 pm Factors of influence during and after the electric steel making process: characterization and optimization of electric arc furnace slag

G. Geißler, Germany
Max Aicher Umwelt GmbH,
Piding

1:15 – 1:30 Potential in iron and steel slags with the use of in situ measurements and heat recovery

F. Firsbach, Germany
Department of Ferrous
Metallurgy (IEHK)
RWTH Aachen University

1:30 – 1:45 Dry slag granulation with heat recovery

A. Fleischanderl, UK/Austria
Primetals plc

1:45 – 2:00 The development of Baosteel slag short flow (BSSF)

H. Jue, China
Shanghai Baosteel Energy
Service Co., Ltd.

2:00 – 2:15 pm The application and breakthrough of BOF slag modification technique in CSC

Y.-H. Tseng, Taiwan
China Steel Corporation

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Room A, Topic 2a

2:15 – 2:30 pm	Blast furnace slag as functional fillers in polymer compounds	A. Mostafa, Austria Polymer Competence Center Leoben
2:30 – 3:00	Discussion	
3:00 – 3:30	Coffee break	
3:30 – 3:45	Development of continuous blast furnace slag Solidification process for low absorption coarse	H. Tobo, Japan JFE Steel Corporation
3:45 – 4:00	Modelling tools for improved recovery of metal and high quality slag	E. Nagels, Belgium InsPyro NV, Leuven
4:00 – 4:15	Automatic liquid BOF slag measurement with LIBS – first experiences	K. Pilz, Austria voestalpine Stahl GmbH
4:15 – 4:30	LD-slag aging: change of chemical and physical properties and the impact on road construction	F. Weiss, Austria University of Technical Vienna
4:30 – 4:45	Valorization of steel slag as a thermal energy storage material for industrial heat storage applications	I. Ortega, Spain CIC energigune, Miñano
4:45 – 5:15	Discussion	
5:30	Departure from the Conference Centre to the hotels	
7:30 pm	Departure from the hotel to the restaurant	

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Topic 2b: Research and Development (Room B) –
Cement and Concrete application (Chairman: Andreas Ehrenberg)

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|----------------|---|---|
| 1:00 – 1:15 pm | Ferrous slags: a true contribution to low-carbon binders and concretes? | A. Ehrenberg , Germany
FEhS – Building Materials Institute, Duisburg |
| 1:15 – 1:30 | More than 65% of slag in composite cement makes it sulfate resistant – really? | W. Matthes , Switzerland
Holcim Technology Ltd, Holderbank |
| 1:30 – 1:45 | New perspectives in the use of electric arc furnace slag as coarse aggregate for structural concrete | F. Faleschini , Italy
University of Padova |
| 1:45 – 2:00 | Analysis of the application of ladle furnace slags from steel-works, of low and high alumina, in masonry mortars | I. J. V. Ramiro , Spain
TECNALIA-Sustainable Construction |
| 2:00 – 2:15 | A real-world experience of valorization of steel slags in the construction sector, two needs and a successful solution | F. Rancaño Lejarraga , Spain
Áridos Siderurgicos Andaluces (Asidan), Sevilla |
| 2:15 – 2:30 | Development of high-density steel fiber Reinforced concrete with EAF slag aggregates for radiation shielding applications | M. Papachristoforou , Greece
Laboratory of Building Materials, Aristotle University of Thessaloniki |
| 2:30 – 3:00 | Discussion | |
| 3:00 – 3:30 | Coffee break | |
| 3:30 – 3:45 | Application of ground granulated blast furnace slag as concrete additive in Germany: the k-value concept of DIN EN 206 | V. Feldrappe , Germany
FEhS – Building Materials Institute, Duisburg |
| 3:45 – 4:00 pm | The use of ground granulated blast furnace slag as a concrete addition: performance concepts of the European concrete standard EN 206 | V. Feldrappe , Germany
FEhS – Building Materials Institute, Duisburg |

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Topic 2b, Room B

4:00 – 4:15 pm	Performance of self-compacting concrete containing EAF slag as aggregate	A. Santamaría, Spain Faculty of Engineering – ETSI Bilbao (UPV/EHU)
4:15 – 4:30	Physical properties of non-opc mortar using blast furnace slag	M. Song, Korea Kang Won National University
4:30 – 4:45	A new process for slags from steelmaking for metal recovery and utilization in the cement industry	G. Wimmer, Austria/ Germany Primetals, Linz
4:45 – 5:15	Discussion	
5:30	Departure from the Conference Centre to the hotels	
7:30 pm	Departure from the hotel to restaurant	

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Topic 3: Optimization of Products and their Application

(Chairman: Heribert Motz)

9:00 – 9:15 am	Utilization of steelmaking slag in Japan and recent progress toward soil amendment	Xu Gao, Japan Tohoku University
9:15 – 9:30	Use of iron and steel slag in Japan: the state of the art	T. Isawa, Japan Nippon Slag Association, Tokyo
9:30 – 9:45	Challenges contemporizing Australian Standards: Supplementary Cementitious Materials	C. Heidrich, Australia Australasian Slag Association
9:45 – 10:00 am	How to use iron and steel slags: a German view	R. Bialucha, Germany FEhS – Building Materials Institute, Duisburg

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Topic 3

10:00 – 10:15 am	Innovative use of BOF slag in agriculture by enrichment with phosphorus	P. Drissen, Germany FEhS – Building Materials Institute, Duisburg
10:15 – 10:30	Impact of long-term application of blast furnace and steel slags as liming materials on soil fertility and crop yields	A. Morillon, France AMEtech, Lyon
10:30 – 10:45	Discussion	
10:45 – 11:15	Coffee break	
11:15 – 11:30	Ladle slag: usage as sealing material	K. Artl, Germany AG der Dillinger Hüttenwerke
11:30 – 11:45	Porous asphalt mixtures containing ladle furnace slag	M. Skaf, Spain University of Burgos
11:45 – 12:00	Road asphalt performance properties using LD-slag	J. Grönniger, Austria/Germany Pavement Engineering Center, TU Braunschweig
12:00 – 12:15	Pavement solutions for low-volume roads using steel slags	V. Ortega-López, Spain University of Burgos
12:15 – 12:30	The actual safety performance of steel slag asphalt	N. Jones, UK Harsco Metals Group Ltd
12:30 – 12:45	Laboratory and field evaluation of hot-mix asphalt with basic oxygen furnace slag	J.S. Chen, Taiwan National Cheng Kung University, Tainan
12:45 – 1:00 pm	Discussion	
1:00 – 2:00	Lunch	
2:00 – 2:15	New recycled aggregates with enhanced performance for railway track bed and form layers	C. Saborido, Spain Comsa Emte
2:15 – 2:30 pm	The effect of chemical composition, microstructure and geometrical features on leaching behavior of electric arc furnace (EAF) carbon steel slag	D. Mombelli, Italy/France Politecnico di Milano

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Topic 3

2:30 – 2:45 pm	V leaching in EAF slags	F. Cirilli, Italy Centro Sviluppo Materiali SpA, Rom
2:45 – 3:00	New applications for an aluminum slag byproduct	H. Epstein, France RVA, Les Islettes
3:00 – 3:15	Study of leaching process of EAF steelmaking dust with sulfuric acid	M. Sharaf, Egypt Ezz Steel Company, Sadat city
3:15 – 3:30	Automated sorting of refractory waste for high value recycling	L. Horckmans, Belgium VITO NV, Mol
3:30 – 4:00	Discussion	
4:00 – 4:10	Closing remarks of the Chairman	
4:10 – 4:40	Closing drinks	

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Room A

4:40 – 5:30	Workshop RFCS: project utilization of EAF slag („SLACON“)	D. Algermissen, Germany FEhS – Building Materials Institute, Duisburg
5:40 pm	Departure from conference centre to the hotels	

Friday, October 23, 2015

8:45 am	Arrival at the steel plant of voestalpine Stahl GmbH, Linz	
9:00	1 st plant tour: group 1 (50 participants)	Assignment during registration
9:15	2 nd plant tour: group 2 (50 participants)	Assignment during registration
9:30	3 rd plant tour: group 3 (50 participants)	Assignment during registration
11:30 am	Small farewell lunch	

A. Santamaría¹, J.J. González¹, M.M. Losañez³, I. Vegas², I. Arribas² and E.Rojí¹

SELF-COMPACTING CONCRETE CONTAINING EAF SLAG AS AGGREGATE

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Abstract

The conversion of wastes into useful resources is one of the priorities of HORIZON 2020. In this research, the objective is to use Electric Arc Furnace Slag (EAFS), a by-product of the steelmaking industry, as an aggregate in concrete. The literature has clearly demonstrated that concrete fabricated with EAFS as an aggregate has at least the same mechanical properties and durability as concrete with natural aggregates.

Self-compacting concrete is a relatively new technology, the performance of which has been enhanced over last decades. The main objective of this research is to fabricate this type of concrete with EAFS aggregate in partial substitution of natural aggregates, to produce EAFS concrete for use under the same situations/conditions/technologies as conventional concrete.

The first step towards that objective is to prepare self-compacting mortars using EAFS fine aggregates. In this study, different mortar mixes are designed to establish appropriate admixtures that are well adapted to the EAFS aggregate, in terms of their cement amounts, the gradation of their fines and their specific proportions. The fresh properties of these mixes should show a suitable consistency without segregation, and their hardened properties - strength and shrinkage – should be reliable.

respect to both SM-1 and SM-2; SM-5 also had a slightly lower amount of EAFS than SM-2. The performance of LF slag may be considered acceptable with regard to mechanical strength.

6 Conclusions

Our conclusions to this work can be stated as follows:

- Self-compacting mixes have been successfully performed using EAFS as a heavy aggregate; a careful control of fines is mandatory.
- Even the use of LF slag in low proportions can be admissible, producing a delay in the increase of mechanical strength.
- The global results in terms of mechanical strength are promising.
- Air-entrainment additives must be carefully used.
- The use of EAFS aggregate contributes little to drying shrinkage.

Acknowledgements

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References

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