

Editorial

Sustainability¹. A word that just seems to roll off peoples lips like some kind of call to action, but what does it really mean? In the context of the construction industry, this term can be hard to define. Embodied in the term are words like 'intergenerational equity' in the resources we use for our construction projects. It can also prompt the question of durability. How long do we expect the structure to last? How much energy is embodied in the structure? And how much energy does it take to operate during its working life? The hard elements such as physical inputs and outputs are fairly easy to plug into a lifecycle analysis, but the bottom line is, how people friendly is the net result? In this issue, we focus on the Barangaroo project in Sydney; where in the concrete 60% of the cementitious binder will be used to reduce CO2 emissions. This will also provide durability of the watertight concrete barrier that will allow for dewatering and excavation of the adjoining basements.



In Melbourne the Innovative "Pixel" building achieved its Green Star

World of Iron and Steel Slag

The Australasian (iron & steel) Slag Association (ASA) hosted an inaugural meeting of 'Global Slag Associations' in Sydney on 23 November 2010 during the conduct of the 6th Global Slag Conference and Exhibition. Some 17 representatives participated from Europe, United States, Japan, India, Korea, New Zealand and Australia, covering more than 90 percent of global iron and steel slag production.

The Australasian (iron & steel) Slag Association, Executive Director Craig Heidrich who chaired the meeting outlined the simple aims for the network. To connect and strengthen our global mutual interest in 'all things' iron and steel slag; to agree on ways to share global experiences, determine common ground where and how we can share these experiences, good or bad. Learn from each other's positive and negative outcomes. To globally coordinate better opportunities

rating of six (6) by the use of materials in the concrete mix, including fly ash (FA), ground granulated blast furnace slag (GGBFS), silica fume, recycled concrete aggregates and recycled water. This project addresses the reduction of CO2 and other intergenerational issues by ensuring recycling of concrete aggregates on site and the use of recognised cement replacements, for example, slag, silica fume and fly ash.

Sustainability is not just about reducing CO2 emissions, recycling resources, and structural durability, but also takes into account design and ultimately the running costs of structures. It takes imagination and courage to change our mindset towards it and ensure intergeneration equity in our construction resources, at least in the places we can influence.



Innovative "Pixel" building in Melbourne

to further strengthen our mutual interest for iron and steel slags and lastly formalise our network with some form of 'charter'.

Representatives agreed there was a shared and mutual interest in the exchange of information concerning the management and use of metallurgical iron and steel slag's (ISS) and the meeting agreed that forming the network would establish an effective and efficient way to accomplish such exchanges.



Where to find more information on the ASA website

¹ Defined: <http://en.wikipedia.org/wiki/Sustainability>

National Slag Association (USA)

There is a long and enduring relationship between the National Slag Association (NSA) and the Australian Steel and Slag Processing industries. This relationship was formed in the early part of the 1960's when the steelworks particularly in Port Kembla was looking at the future of increasing production and a shortage of opportunities for the use of iron and steel slags. This enduring relationship has been one of mutual support in developing conferences and sharing research resources. Initially developed with the Australian Steel industry it has been carried forward through the Australasian (iron & steel) Slag Association (ASA) since its formation in 1990. ASA's Executive Director, Craig Heidrich, met with NSA members whilst in Detroit on 5 May 2011 when attending various meetings with WiOSS network members and the American Concrete Institute.

NSA members were updated on legislative developments within Australia, in particular general exemptions granted by OEH New South Wales for the use of blast furnace slag (BFS), steel furnace slag (SFS), electric arc furnace slag (EAFS) and most recently ladle furnace slag (LFS). Country production data, slag utilisation and market options for slag use were discussed.

NSA members provided an update on a major EcoTox report into the use of slag in construction applications. The report was expected to be finalised in late 2011.

This mutual sharing of information has been of great benefit and had benefited both Associations.

Steel Stewardship Forum

The Forum was initiated by Australia Steel Institute, BHP Billiton, Bluescope Steel, The Crucible, Ecofutures, GHD, Green Building Council Australia, OneSteel, Rio Tinto and WWF Australia - in association with the Australian Government (DRET), Eden Project (UK) and World Steel Association.

The forum objectives, whilst developed in 2008, provide timely focus on building a strong Australian steel manufacturing industry, namely; To maximise the value of steel to society while minimising negative commercial, social and environmental impacts across the life cycle; To ensure policy makers, governments and the public generally are aware of the value of steel; To unite key stakeholders along the steel product life cycle chain within a structured forum; To work as a hub linking information, knowledge, leading practice and activity in the areas of environmental improvement and sustainability across the steel life cycle.

A catalyst for the forum formation was the APEC Ministers Responsible for Mining meeting held in February 2007. The ministers believe the Steel stewardship would make a positive contribution to global sustainability issues for the steel industry. Formation work begun quickly over 2008 and 2009 including issues with structure, membership and funding. Ideas generated during the forum workshops lead to progressing two projects and after securing funding over the course of 2010, these projects commenced in 2011.

Steel Certification Project: To be known as 'Responsible Steel' - developing a clear measurable environmental certification process across the whole of the steel supply chain from mining to scrap recovery, and measuring progress in environmental improvement against a set of agreed benchmarks. To be used as criteria for the supply of steel products into the Australian market.

Steel Chain Footprint Project: a high level Input-output mapping of the Australian steel chain to highlight which areas of the steel value chain contribute most in key inputs/outputs relative to resource use and emissions/waste, and to identify current management programs, and environmental areas of opportunity that deserve further sectoral attention by the SSF outside of what specific company's may be able to undertake.

The ASA was invited to become members of the forum in 2010, primarily to contribute our collective industry supply chain knowledge on the production, processing and use of iron and steel slags. Craig Heidrich, Executive Director for the association said 'published data on the environmental benefits (offsetting of emissions by displacing natural or emission intensive materials) arise through the productive use of iron and steel slag will be our main contributions'.



Steel Stewardship Forum
Responsiblesteel

For more information please visit www.steelstewardship.com

Ladle Furnace Slag (LFS) exemption

Culminating after more than 12 months of consultation, testing and data collection with generator, processors of electric furnace ladle slag (LFS) and OEH NSW the Association has secured an exemption. The exemption provides legal certainty around the conditions under which electric furnace ladle slag can be used in construction and other projects.

Craig Heidrich, Executive Director of the ASA said, "The Association and Office of Environment and Heritage, share a common objective in encouraging resource recovery of materials which otherwise would be placed in unproductive landfill - resulting in poor resource conservation outcomes". "Setting the expected properties and general conditions of use brings assurance to the users, producers and indeed the community allowing the material to be used appropriately.

Members, in particular generators have provided a significant amount of material and testing support to underpin the general exemption data. Working closely with the Associations Executive Director and staff - the outcomes were an excellent example of 'Doing together what we could not do alone'.

A copy of the general exemption is available from the OEH website <http://www.environment.nsw.gov.au/waste/generalRRE.htm>



Electric arc furnace ladle slag

Ground Granulated Slag to benefit Sydney Landmark Construction project - Barangaroo South

One of Sydney's most innovative and controversial construction projects is about to kick off with Barangaroo. Site works have begun in earnest with concrete companies being called to supply rates and mix designs for the construction of the retention wall. This wall, also known as the diaphragm wall, will be the perimeter of the future basement on site. Up to 15000 m3 of concrete will be used, and the concrete will contain up to 60% GGBFS, predominately to reduce CO2 emissions, but also to provide a superior, durable concrete offering many years of service. This wall will form a watertight barrier to prevent water inflow from the harbour and allow dewatering and excavation for the construction of the shared basement. This marks the start of major work and will commence in the next few weeks. Overall there will be over

450,000 m3 of concrete used over a four year period. The majority of concrete used will contain elements of sustainability, with more than half using GGBFS and recycled aggregates.

Barangaroo is a great opportunity for all of Sydney. Just like Sydney achieved with the Olympic Games back in 2000, Barangaroo will showcase Sydney, and the magical harbour as the best city in the world. The revitalising of Barangaroo is a phenomenal project and certainly one of the most significant for Sydney city in two centuries.



Company Members

A primary role of our Association is to bring together Slag Producers, Processors, Customers & Suppliers to the Slag Industry. Our activities cover technical developments, plant operations and processes, education and promotion. If you would like more information on the Association and how you can become involved, simply complete the information section at the end of this newsletter. Current membership is as listed.

Australian Steel Mill Services Pty
BIS Industrial Logistics
Boral Cement Ltd
Bluescope Steel Ltd (Port Kembla)
Cement Australia
Concrete Pty Ltd
Holcim Pty Ltd
Holcim NZ Ltd
Harsco Metal Holdings Pty Ltd
Independent Cement and Lime Pty. Ltd
Monash University

New Zealand Steel Minerals
OneSteel Limited
Roads and Maritime Services
Steel Cement Pty. Ltd
Swinburne University of Technology
University of Newcastle
University of Queensland
University of Wollongong

Personal Members

Anderson, L
Gregory, G
Hanley, P (Hon.)
Heaton, B (Hon.)
Hinczak, Dr, I (Hon.)
James, W (Hon.)
Jones, D E (Hon.)
Prosser, S D (Hon.)
Venour, M (Hon.)

Related Associations | Canadian Slag Association | National Slag Association (US) | Nippon Slag Association (Japan) | European Slag Association (EU)

Melbourne's Innovative Pixel Building achieves 6 Green stars

Based on an article by Richard Collins – Waste Management and Environment Magazine – September 2011 (p29)

Concrete was a key building product for Roman engineers more than 2000 years ago. In the period since, the whole matter of what is concrete and in particular what constitutes cement has been subject of extensive research and much discussion. WME Magazine in its article on Melbourne's Pixel building states that 'Concrete is the most widely used building material with 30 billion tonnes manufactured globally each year.'

Cement, a key ingredient of Concrete is Portland cement, the production of which releases about a tonne of CO₂ for every tonne of product. Given the scale of this industry it is estimated to produce up to around 5 % of total world greenhouse emissions.

Victoria has in more recent years been driving the pace towards "green buildings". Council House 2 Melbourne, for some time held the position of a model green star building. The stakes are high both economically and environmentally to develop ways of minimising waste and utilising materials such as recycled aggregates, Ground Granulated Slag, fly and silica fume.

In searching for the ways to produce a low energy building, Victoria's MIT established a low carbon hub in 2009 with the object of developing a low-carbon concrete 'specifically for the London Olympics'. Out of this came the development of a material called "Pixelcrete", the 'brainchild of building company 'Grocon.'

Mix design includes fly ash, ground granulated blast furnace slag, silica fume, reclaimed aggregate, recycled demolition concrete aggregate and recycled water.

The net result of this work is the quite striking Pixel Building with a calculated global warming potential lower than comparative concrete mixes and satisfying Australian Standards.

Further information www.pixelbuilding.com.au/

Melbourne's Pixel building



Helsinki is the venue for the 2011 Global Slag Conference

November is not the time when we from down under would generally consider embracing the Northern Hemisphere's winters. However the organisers have given us the assurance that; *'despite its cool climate, you are assured of a warm welcome in Helsinki! The conference will take place in the heart of Scandinavia's iron & steel belt and will be close to the headquarters of a number of the world's largest producers'*. They confidently predict there will be 120 delegates from 30 countries present. Events such as the Global Slag Conference provide for much more than information about slag and processing and marketing.

The conference provides a platform for building networks and creating an environment where practitioners and researchers meet, sparking the opportunities for new initiatives and seeking answers to common questions in different parts of the world. It was in this environment that the network of Iron and Steel Slag associations connected at the 2010 Conference in Sydney Australia 2010.

Main themes of the Conference include

- Making the most of the recovery
- Slag and Sustainability
- Surviving the Slag crisis
- Growing market share

Helsinki has been described as a pocket sized metropolis. The following key papers are already listed for presentation.

- 'Global slag overview,' Charles Zeynel, ZAG International
- 'Latest developments in steel and slag production in the US and regulatory trends,' Karen Kiggins, National Slag Association
- 'Slag markets and usage in the US,' Tim Stanfield, Tube City IMS and NSA Marketing Committee Chairman

- 'Use of steel slags in North America,' Bill Stanley, ZAG International
- 'Strategies For Marketing GGBS,' Conor O'Riain, Ecocem Materials Ltd
- 'P84 needle felt blends as problem solvers in mill filters,' Dr. Stefano Santorsola, Ing.Georg Rathwallner, Evonik Fibres GmbH
- 'Long-term changes in physical and chemical characteristics of Hydrated solids of iron and steelmaking slag,' Yotaro Inoue, JFE Steel Corporation
- 'Gebr. Pfeiffer vertical roller mill MVR: New levels of slag grinding' Dr.Ing. York Reichardt, Gebr. Pfeiffer AG
- 'Optimisation of heat treatment conditions of recycling of steel slag as co-additive in clay bricks,' Engr. Khurram Shahzad Ayub, University of Gujarat, Pakistan
- 'Dry granulation of the molten steelmaking slag by using the vertical multi drum atomizer,' Sunguk Ryu and Heungsoo Park, Research Institute of Industrial Science & Technology (Republic of Korea)
- 'Characterization of Slag-Rec dry granulated EAF slag,' M. Gelfi, G. Cornacchia, R. Roberti (Università degli Studi di Brescia); M. Svanera, F. Uberto (ASO Siderurgica)

Full details are available on line at the Global slag website:

<http://www.propubs.com/events/global-slag>



Concrete Institute of Australia- Concrete 2011 Conference

The Concrete Institute of Australia's 25th Biennial Conference was held in Perth, Western Australia, from Wednesday 12 October to Friday 14 October 2011.

The Technical Program was highlighted by an Invited Speaker plenary session on each conference day. The three speakers were:

- **Professor Ravindra Gettu:** Indian Institute of Technology, Madras, India. Professor Gettu is a widely recognised authority on concrete as a material, with interests in a variety of concrete performance characteristics, and also in aspects of sustainability.
- **Linda Figg:** CEO Figg Engineering Group, Tallahassee, Florida, U.S.A. The Figg Group is a relatively small but highly influential consulting firm specialising in bridge engineering, with a portfolio of inspirational structures which have realised the company's philosophy of 'creating bridges as art'.
- **Martin Clarke:** CEO British Precast, Leicester, U.K. British Precast is a vibrant organisation which covers all aspects of precast, and in particular is very focussed on sustainability issues and the role precast concrete will play in the future. Mr Clarke brought a British and European perspective to our conference.

The Associations presence again generated much interest amongst the delegates and provided an excellent opportunity to communicate and engage with users of Slag. During the three days, over one hundred and fifty (150) ASA USB's were distributed, pre-loaded with the Associations published Technical Information inclusive of the recently produced Reference Data sheets.

The various associated social events culminated at the Gala Dinner on the Friday. The Concrete Institute Gala Dinner in Perth has become a very popular annual event, and in 2011, it was incorporated into the Biennial Conference. This made for a really special night as it featured the



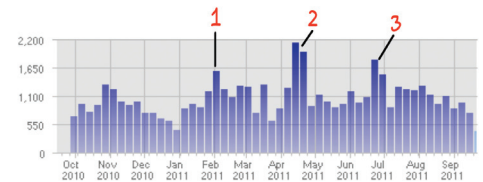
ASA booth at Concrete 2011 with Alison Fitzgerald, Craig Heidrich and Kylie Dal Santo

ASA website update

Since its inception in 1990 the Association has carried out its education and communication work in the form of research papers, conferences and lectures and making available to members, students and the Community a significant amount of the Associations reference material through our online library.

The decision last year to take our newsletter Connections online proved to be a good move. It has a greater sense of immediacy and a more direct link with both our members, industry sector and the broader community. Not only has the newsletter been updated more easily, and quickly, it provides scope to increase content. It has also proven to greatly boost the amount of downloads from the ASA Website.

This is the fourth online edition to be published this year and it seems each newsletter has been popular among members and the public. The graph below shows the peaks and troughs of the ASA website downloads. There is a definite trend between the placement of peaks and the publication of a Connections newsletter. The red numbers represent the first, second and third electronic editions of Connections to be published this year.



AUSTRALASIAN

Conferences

The **Concrete Institute of Australia** staged a series of conferences entitled Design Guidance A3600 2009 with a panel of experts including Prof Ian Gilbert, Prof Stephen Forster and Mr Gill Brook. Session dates were Perth November 7th, Adelaide Nov 9th, Melbourne Nov 11th, Sydney Nov 16th and Brisbane Nov 18th. It is noted that Professor Ian Gilbert was recognised with an award for excellence on October 14th at Concrete 2011 in Perth.

14 November 2011

Building Simulation 2011 conference: Driving better design through simulation:

Aerial UTS Function Centre Level 7, UTS Building 10, 235 Jones St Ultimo, Sydney, Australia. Building performance simulation is increasingly becoming embedded in the design process. Building Simulation 2011 will explore current best practice and new horizons for the use of simulation to drive better building design.

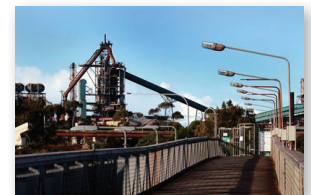
No. 6 Blast Furnace in Port Kembla closed

BlueScope Steel announced the reduction of manufacturing capacity at Port Kembla and Western Port citing the difficulty in maintaining the export part of its business due the current business climate including raw material costs and the strength of the \$. No. 6 Blast furnace produced around 50% of the plants iron and slag production. Further information contact: www.asa-inc.org.au

New Joint Membership Offering

Concrete Institute announced offers to personal members of Joint Concrete Institute ACI membership.

This provides electronic and hard copies of ACI'S "Concrete International Magazine" "Materials Journal" and "Structures Journal", Access to ACI's Knowledge Centre is also included. Existing personal members can also participate. For further information contact the Concrete Institute of Australia.



Port Kembla no. 6 Blast Furnace

Retrofitting for Commercial & Environmental Sustainability

21 - 23 November 2012

Grace Hotel Sydney & Park Regis Brisbane

Retrofitting for Commercial & Environmental Sustainability Conference:

- 21st-23rd November, Park Regis, Brisbane
- 28th-30th November, The Grace Hotel, Sydney

'Retrofitting for Commercial & Environmental Sustainability' will combine government representatives, industry organisations, case-studies of successful retrofits, as well as sustainability managers, building owners, engineers and architects, as speakers in the event, to cover the broad scope of eco-retrofitting for all parties involved.

International

The 7th Global Slag Conference will take place in the heart of Scandinavia's iron & steel belt and will be close to the headquarters of a number of the world's largest producers. Slag continues to be both a problem and an opportunity - for both the iron & steel industry and for the cement and construction materials industries around the world. Despite its cool climate, you are assured of a warm welcome in Helsinki!

For information on the program contact www.probus.com/gsc

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