



## Editorial

With another year almost gone, 2014 has been a year of positive developments for members of the Australasian (iron & steel) Slag Association. With a number of key member projects taking place including the installation of new Grinding Plant facilities in Port Kembla, NSW and Port Melbourne, VIC, the Oran Park road upgrade, coupled with the recent \$3.1 million research project announcement by the Cooperative Research Centre for Low Carbon Living - this continued investment demonstrates a commitment to furthering the beneficial outcomes associated with the use of iron and steel slags (ISS).

In this edition, we re-introduce Dr Jason Nairn, National Technical Manager for Boral Cement who has been welcomed back to the Association. As someone who has worked within the construction materials industry continuously over 25 years, his Member Employee Profile is testament to his diverse and long-standing interest in ISS.

Importantly, the Roads Guide Review Project has continued to progress throughout 2014 with the publication of *Quick Reference Guide 3: Steel Furnace Slag* which has been provided as an insert in this edition of Connections. Many thanks to the authors who have

worked hard to drive this project, particularly the content development with their focus now turning to *Quick Reference Guide 4: Electric Arc Furnace Slag* in 2015. Given that this product is more of a speciality, Association Members are encouraged to become involved.

In terms of industry events, the Australasian (iron & steel) Slag Association attended the Construction Materials Industry Conference (CMIC) 2014, providing important networking and member generation opportunities. Looking forward, there are a number of conferences on the horizon with the Global Slag Conference in December 2014 and EuroSlag in October 2015. One of the predominant Australian industry conferences, Concrete 2015, will take place on 30 August- 2 September 2015 at the Pullman, Albert Park, Melbourne with a focus on 'Research into Practice'. Members are encouraged to attend and support their industry representatives and we look forward to seeing you there!

On a final note, the Association would like to wish its members and their families a safe and happy Christmas. We are looking forward to working with you in 2015.

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# DR JASON NAIRN

Jason Nairn has recently joined Boral Cement as National Technical Manager. This is a key senior management position in the company which supplies cementitious material, ground granulated blast furnace slag, fly ash, lime, limestone and a wide range of construction materials. Jason is responsible for advising on relevant product and process technologies, product development and liaison with industry and major customers.

## ***What do you see as the key benefits that can be obtained by using Ground Granulated Blast Furnace Slag (GGBFS) as a Supplementary Cementitious Material (SCM) in the manufacture of concrete?***

The use of Ground Granulated Blast Furnace Slag (GGBFS) in cement blends provides significant performance and durability improvements to a wide range of concrete materials while also providing environmental and economic benefits.

For example, the GGBFS provides cement blends with a lower heat of hydration which can be used to reduce the risk of long term degradation from Delayed Ettringite Formation (DEF) and cracking by reducing the peak and differential temperatures occurring in early age curing of mass concrete. Concrete for marine applications containing GGBFS also have increased resistance to chloride ingress providing effective and cost efficient long term protection to underlying reinforcement.

## ***What has been your involvement in the construction materials industry and experience with slag?***

I have had over 25 years of continuous involvement in the manufacture or use of slag since graduating from University.

After completing my undergraduate degree in Metallurgy at The University of Queensland (UQ), I had the opportunity to work with Mount Isa Mines (MIM) from 1988 to 1991 on optimising the operation of a blast furnace through improvements in the manufacture of the sinter and resultant slag. This was a co-operative project between Smelting Research (MIM) and Pyrometallurgical Research (UQ). The project involved both on-site experimental work at Mount Isa as well as a research program at UQ and was of an interdisciplinary nature with research being undertaken in mineralogy, process metallurgy, solidification, crystal growth and chemical engineering.

From 1998 to 2003, the QCL Group of Companies (now part of Cement Australia) employed me as the Product Development Manager where I was responsible for the development, implementation and management of product and process development activities throughout the group. This involved investigations into the use of Granulated Blast Furnace Slag (GBFS) in the manufacture of GGBFS as an SCM for concrete, including work with Australian Steel Mill Services (ASMS), aimed at investigating and improving the granulation process and the resultant granulate.

From 2003 to 2007, I was employed by Sunstate Cement Ltd at a cement milling facility at Fisherman Islands, Wynnum, as the Production and Technical Manager, responsible for the Production and Laboratory Departments. The use of GBFS was key to the production of a range of blended cements developed for the market with its inclusion in General Blend for general construction, Low Heat for mass concrete, Road Blend for stabilisation and Special Purpose for durable concrete.

From 2012, I worked with AECOM Pty Ltd as a Technical Director in the role of Team Leader for the Advanced Materials Group in Queensland. A key part of this role was supplying concrete technical advice on raw materials, mix designs, durability planning and construction management. The use of GGBFS, as part of the cementitious blend, was commonly specified to ensure that infrastructure designed or constructed met the required durability requirements.

During my time at Sunstate Cement Ltd, I was involved with the ASA and look forward to rejoining this influential industry body and the subsequent discussions that will follow.



**Boral**  
Cement



## INTRODUCTION

**Steel furnace slag (SFS) is the co-product of the basic oxygen steel making process (BOS). The slag is removed from the vessel after the exothermic refinement of molten iron and recycled steel in the presence of fluxes and oxygen.**

SFS is a co-product of the conversion process of molten iron to steel in a basic oxygen steelmaking within an integrated steelworks. A chemical reaction occurs within the vessel after the oxygen lance is lowered, a protective slag layer forms with the addition of lime. When the reaction has been completed, the steel and slag are separated and molten slag is poured into pits where the slag is cooled with water sprays before haulage for processing. See *A Guide to the Use of Iron and Steel Slag in Roads* for further information.

## TYPICAL PHYSICAL PROPERTIES

**Table 1 - Typical Physical Properties of SFS.**

Typical Physical Properties- Aggregate	Steel Furnace Slag
Bulk Density (t/m <sup>3</sup> )(loose)	1.5-1.8
Dry Strength (kN)	260-300
Wet Strength (kN)	240-280
Wet/Dry Variation (%)	5-15
Water Absorption (%)	2-4
LA Abrasion	15-20
Polished Aggregate Friction Value (PAFV)	54-60
Sodium Sulfate Soundness (%)	<1
<b>Physical Property- 20 mm Road base</b>	
Maximum Dry Density (kg/m <sup>3</sup> ) <sup>2</sup>	2.4-2.6
Optimum Moisture Content (%) <sup>1</sup>	10-12

Notes:

<sup>1</sup>OMC depends on the components of the mix.

<sup>2</sup>MDD based on 100% standard compaction.

SFS has a dark grey colour, with a particle density that is 20% greater than basalt and harder than blast furnace slag (BFS). This product crushes into a cubical shape and has the potential for expansion if not adequately weathered. Weathering is typically achieved by periodic watering, monitoring and internal stockpile management procedures developed by suppliers of SFS aggregates. Requirements for free lime limits, where provided, should be met before supply.

## TYPICAL APPLICATIONS

Advantages offered by SFS include the availability of free lime which has been recognised with the development of self-cementing, heavy duty pavements. Unconfined compressive strength (UCS) > 5 MPa has been achieved at 28 days. Also, as a tough, durable material, SFS has excellent skid resistance properties, making it an ideal aggregate for pavement surfacing applications. Resistance to rutting makes SFS particularly applicable for heavily trafficked corners and stopping zones.

**Typical uses for SFS are:**

- Sealing/asphalt aggregate
- Pavement base and sub-base layers
- Engineering construction
- Sub-soil drainage

The main typical applications for the use of SFS come under the following specifications as shown in Table 2 below:

**Table 2 - Applicable SFS Specification.**

SFS Type	RMS/VicRoads
Unbound	R71
Bound	R73
Select Fill	R44
Aggregate	R33

## ASPHALT

SFS has many properties that make it suitable for use in asphalt. It is a hard, dense, durable and well-shaped aggregate that has a strong affinity for bitumen. The skid resistance and anti-polishing properties make it an ideal aggregate for asphalt surfacing including open grade, dense grade and stone mastic asphalt.

As SFS may contain small amounts of potentially expansive products such as burnt lime and dolomite, sufficient moisture and time must be provided to enable hydration of these materials to avoid expansion.

## PAVEMENTS & ENGINEERING

### *Bound Steel Slag Pavements*

The working time for a bound pavement is typically the time measured from the commencement of blending the binder to the material to be bound, to the completion of the compaction of the bound material within the pavement. The use of material



within its working time is of critical importance when bound pavement materials are placed in layers. Working time is not simply the time within which the materials placed are workable, but rather the time within which layering of bound pavement can occur without risk of de-bonding/lamination or loss of ultimate pavement strength.

The nominated working time is the lesser value of the Maximum Dry Density (MDD) and the Unconfined Compressive Strength (UCS).

Layering of bound pavements within relevant material working times will still require the underlying surface to be scarified (not profiled or milled) in some way. This is essential to remove the smooth surface created by either smooth drum rolling or rubber tyre polishing created by trucks tipping on the lower surface.

### Moisture Content

Slag blended pavements are less sensitive to moisture than conventional materials.

### Unbound Steel Slag Pavements

SFS can be successfully utilised in unsealed roads and industrial hardstand areas.

For unbound applications, each site or project should be reviewed to ensure that the SFS used is fit for purpose for the given application. Construction guidelines should be considered on a site-by-site basis to ensure all relevant site conditions are addressed. Whilst weathering of SFS is undertaken to limit potential material expansion, SFS may not be suitable for use in some applications.

SFS can be placed in layers up to 300 mm thick, although for most unbound applications, 150-200 mm of material is generally adequate.

### Placement

Construction joints occur where bound material is placed against previously placed bound material which is outside the bound material's working time. Where this occurs, a clean, compacted, vertical perpendicular surface should be cut to the full depth of the pavement layer thickness for both transverse and longitudinal construction joints. This will reduce the risk of plating effects on the pavement. All spoil material should be discarded and not incorporated back into the works.



**Figure 1 - Longitudinal construction jointing.**

Due to their rigidity, cracks occur in bound pavements. The risk of this occurring can be reduced by managing the correct location of joints, such as:

- Limiting the overall pavement widths;
- Ensuring joints are not in wheel paths; and
- Ensuring joints in sub-base layers are offset to joints in the base layer.



**Figure 2 - Transverse construction joint.**

## ENVIRONMENTAL CONSIDERATIONS

Several comprehensive studies of SFS have shown this material and its leachate contains trace amounts of metal well below trigger levels for environmental investigation. The primary environmental risk when utilising SFS in road making applications is the potential for alkaline leachate to enter local waterways. This risk is minimal when SFS is incorporated into well-designed and constructed roads with adequate drainage and decreases over time as the material gains strength. Hours to days of direct stagnant contact with SFS are required for the pH of water to reach environmentally significant levels. Water sheeting off a road or hardstand area is not in contact with free lime contained in SFS for a long enough period to produce high pH run-off. An approach to using SFS around rivers and streams is to maintain a 5-10 m buffer either side of the normal waterway flow if unsure engineering design is adequate. Being a co-product of the steel manufacturing process, exemptions have been granted for use in road making. See *QRG 1* for further information.

## CASE STUDIES

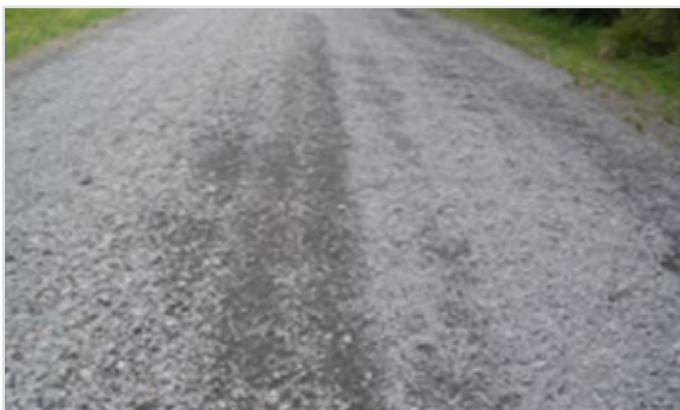
### Case Study 1: Unsealed Rural Road at Misty Lane, Jamberoo NSW

Misty Lane is a 2 km privately owned and maintained rural road located in Jamberoo and used by 7 properties. This project required a 20 x 0 mm SFS road base, its main feature being that the slag product was used to achieve a low technical but high quality outcome.

It was found that there were little obvious problems with the SFS product after regular inspections. As the material took longer to harden, the surface which was initially pliable allowed for loose stone to be forced into the surface which increased compaction and subsequent road life for the local residents.



**Figure 3 - SFS road base used at Misty Lane, Jamberoo.**



**Figure 4 - Close-up of SFS road base.**

### **Case Study 2: Stabilised Steel Furnace Slag (SFS) Used in Lightly Bound Pavement Application**

An unsealed hardstand for heavy equipment storage was constructed at Kooragang Island.



**Figure 5 - 6 mm SFS minus dust used at Kooragang Island.**

This project required SFS 6 mm minus dust blended with a binder to produce a UCS strength at 7 days accelerated using RMS Test Method T116 of between 1.0 and 1.5 MPa.

The SFS dust was blended with a binder in a computer-controlled pugmill then delivered to the site via truck and dog configurations. Material was placed and compacted using a grader and smooth drum roller with approximately 600 tonnes placed per day of production.

This material is to remain unsealed during service life and therefore required a smooth impermeable finish to meet the tight grade tolerance for control of surface storm water runoff.

## **LIFE CYCLE ANALYSIS (LCA)**

The benefits of using the stabilised SFS dust for this application were numerous as follows:

- The stabilised SFS dust provided an effective solution to other investigated pavement designs being a traditional concrete pavement, or RMS specified heavily bound pavement, or using natural quarried road base materials with an increased pavement thickness. The quarried materials would also require a spray seal to provide the desired durability and storm water run-off properties.

The stabilised SFS dust was more than fit for purpose providing the client with:

- An impervious surface;
- Minimum dusting for an unsealed pavement;

- High bearing and tensile strength;
- Reduced pavement thickness;
- Along with benefitting the environment through recovery and recycling of an industry waste material, reducing the carbon footprint for this project and protecting natural resources and the environment from further degradation; and
- The hardstand has been in service for over 12 months with the client being very satisfied with the performance to date.

## **CONCLUSION**

In terms of its competitive advantages in relation to other materials, iron and steel slag (ISS) products have been proven for use in various types of applications including: cement and concrete manufacture, civil works, road construction, rehabilitation and stabilisation of existing roads, car parks and pavements.

Economically, ISS products are comparative to other traditional resources but should be assessed on a case by case basis given the other performance and environmental advantages.

The Australasian (iron & steel) Slag Association continues to advocate for the current and potential uses of slag products as well as improving regulatory understanding of the benefits arising from slag use.

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# THE EARLIEST DAYS OF SLAG IN AUSTRALIA

## A TRIVIA QUESTION:

When and where was the first iron slag produced in Australia?

Would you believe it was well before the commercial production of blue metal from two of Australia's now famous quarrying areas sites being Kiama on the NSW South Coast and Prospect Hill situated west of Sydney? Admittedly, it's a sneaky question as the clue is in the word 'commercial'.

To produce iron and the resultant slag, you must have iron ore for its iron content, coal, coke or charcoal as a fuel and limestone for the flux. In early colonial days, minerals were usually discovered by accident rather than deliberate prospecting. For example, the Broken Hill silver and lead deposit was discovered by a boundary rider who tripped on a rock in the 1800s.

In 1833, just 50 years after Captain Phillip brought the First Fleet into Sydney Farm, Surveyor Jacques discovered ironstone in a road cutting being excavated for a creek crossing near the present town of Mittagong in the NSW Southern Highlands. The stone contained 48% iron, coal and limestone which were found nearby and a Catalan furnace was built at Mittagong in 1848. Here the first iron and slag co-product were produced in Australia, although not in commercial quantities. This came half a century later in Lithgow NSW. History has shown that through a series of takeovers, this company is now known as Bluescope Steel.



The original name of the Mittagong plant was Ironstone Bridge and in 1851, the Fitz Roy Iron Mining Company was formed. Interestingly, it's name originated from a visit to the site in 1850 by the NSW Governor Sir Charles Augustus Fitzroy. Unfortunately, like so many of the early attempts to produce iron and steel in the new colony, local companies could not compete with the cheaper iron 'pigs' imported from England as ballast for the clipper ships which came to transport wool and wheat from Australia. This was in part the result of a lack of import tariffs instituted by the colonial government at the time.

Very little remains of the Fitz Roy Iron Works and the site has recently been developed into a large satellite shopping centre. Next time you travel the old highway, just a couple of kilometres south of Mittagong, visit the elevated shopping complex. Of note is that the ground level contains the undercover car park instead of being situated below ground to ensure conservation of the heritage site.

At the northern end, you will find, an area of carefully restored historical foundations for the original Iron Works including viewing areas, lighting and information panels, all of which ensure the artefacts are fully protected from the weather. The site is well worth a visit as a reminder of just where Australia's iron and steel industry began; something we take for granted today.

Doug Prosser was inaugural (1990) Executive Director of the Australasian (iron & steel) Slag Association. Doug continues his passion and interest for all things iron and steel slags!



# Steel Cement Pty Ltd: \$60m Upgrade for Slag Grinding Facility

As Steel Cement (SCL) approaches its 24th year of operation, it is timely to reflect on where the industry has been and more importantly where it will be in the next few years. Steel Cement was a pioneer in the production of ground slag products destined for use in concrete, masonry and civil applications.

Steel Cement recognised early, the benefits of producing neat milled slag on a Vertical Roller Mill (VRM) and post blending, it has been successful in promoting the benefits of Slag and offering a slag supply to the entire Victorian industry.

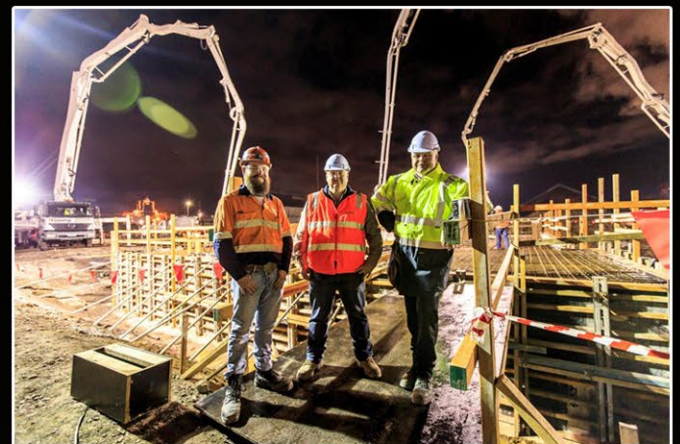
Together with its parent company, Independent Cement & Lime Pty Ltd (ICL) and its two major shareholders, Adelaide Brighton Cement Ltd (ABL) and the Barro Group, Steel Cement has led the way in slag production and distribution in this country.

Ground slag consumption has steadily increased in the various market segments in our supply chain. Support from VicRoads, Consulting Engineers and from local Governments has played a vital role in increasing the application of slag blended cements in concrete, masonry and road stabilisation.

Steel Cement sees this demand trend will continue and with a milling operation located just 3km from Melbourne's CBD, it has been well positioned to service the buoyant greater Melbourne and Victorian market. However with peak monthly demand now out stripping mill capacity, Steel Cement has embarked upon a new grinding facility, which will see it double its current output to. Keen to retain the benefits of a VRM and its proximity to the CBD and the Port, Steel Cement is constructing a new \$60m grinding plant and SCM terminal at Yarraville on land which adjoins the Port of Melbourne, therefore ensuring Steel Cement can meet future demands for the product. Commissioning for the new plant is on schedule for August 2015.

Asked about what is new with the Mill, Alan Dow (SC's General Manager) reported that there are a number of efficiency gains with the new plant design, however the principle of the VRM remains the same as the current Mill; Customers can therefore expect the same level of quality from the new facility". Interestingly one notable difference, Alan was pleased to add, was "this time we have been able to incorporate slag into the mill foundation, the original footing was constructed with limited quantities of Fly Ash" as slag wasn't available in 1990. The 1,200 cubic metre mill foundation pour at Yarraville incorporated a 35-65% cement/slag blend, which is an ideal application for a concrete foundation demanding a low heat of hydration.

Please follow the link to view the time lapse video of the recent concrete pour: <http://goo.gl/h8wv57>





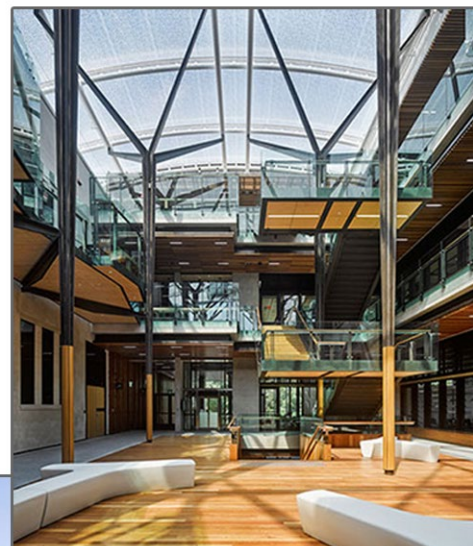
# Project Report: UQ 'Living Building'

In 2014, the University of Queensland was recognised for its \$32 million 'Living Building' with the award of an Education Design v1 rating from the Green Building Council of Australia.

The Global Change Institute (GCI) building contains 33 precast floor beams containing Earth Friendly Concrete (EFC). With an area that spans 3, 865 sqm, Hassell Architects sought to challenge the parameters of sustainability to ensure the building operates on net zero-energy using solar power, rain water storage and the first low-carbon concrete produced in the world.

Specifically, Earth Friendly Concrete (EFC) was developed by Wagners over a period of 8 years and comprises no Portland Cement. Instead, this product consists of sand, aggregate, fly ash, ground granulated blast furnace slag and activator chemicals and admixtures. Whilst there are the obvious environmental benefits of using this concrete, it also provides high levels of performance with high resistance to sulphate attack, chloride ingress and low shrinkage.

This innovative project was also recognised at the 2013 BPN Sustainability Awards. Importantly, Wagners are also in-kind contributors to the Cooperative Research Centre for Low Carbon Living, working with the Association on our low carbon concrete project.



## Cooperative Research Centre for Low Carbon Living allocates \$3.1 million of project funding for next three years to low carbon concretes

In September 2014, Project Leader, Professor Stephen Foster, UNSW announced during the 'kick off' meeting of industry partners that the Cooperative Research Centre for Low Carbon Living had granted approval for the \$3.1 million project over the next three (3) years; *RP1004: Performance Based Criteria for Concretes - Creating Pathways for Low Carbon Concrete Manufacture with Existing Standards*.

Prof Foster said 'this project is a significant one, building on the foundations of our initial project findings which need to address the current gaps in Standards to provide clear pathways for designers and engineers towards low carbon concretes.'

In particular the major project focuses on alternative pathways to the carbon emissions arising from the manufacture of Portland cement in Australia, which is estimated as eight million tonnes/year. Industrial by-products, such as coal combustion products (CCPs) and iron and steel slags (ISS) which are not effectively utilised can potentially replace a significant amount of Portland cement use in concrete structures.

The main barrier identified by the research committee to utilisation of these by-products is due to gaps in Australian standards, which do not recognise concretes without Portland cement. This project will explore alternate pathways for low carbon concretes to be used with existing standards by developing a performance based criteria for concrete, which may not contain Portland cement.

To view more information on the Project Partners, please see links below:

[Swinburne University of Technology](#)  
[University of New South Wales](#)  
[Ash Development Association of Australia](#)  
[Australasian Slag Association](#)



LOW CARBON LIVING  
CRC



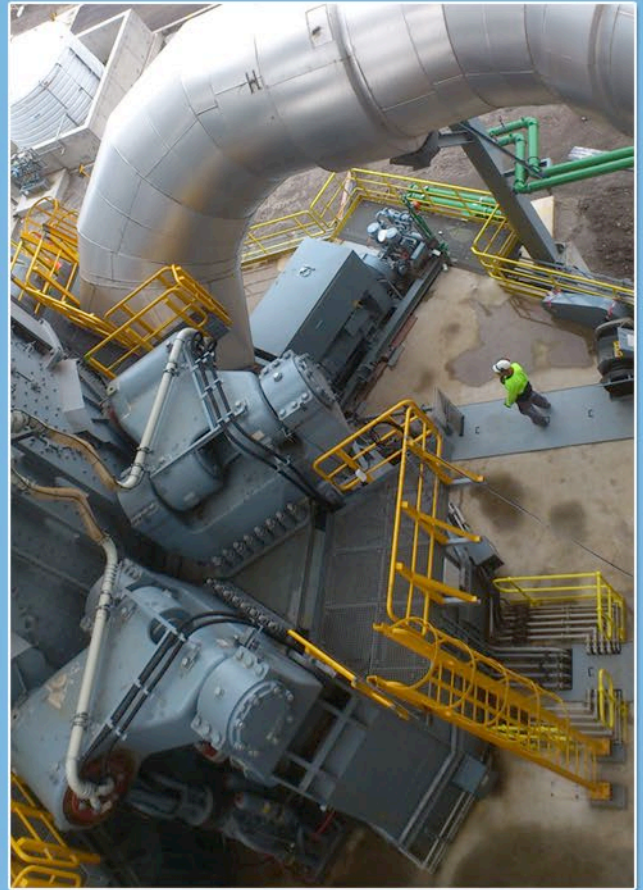


## Project Report: Installation of New Grinding Plant Facilities

After 6 years of planning and more than 12 months after the first soil was turned, the Ecocem-Cement Australia joint venture Vertical Roller Mill at Port Kembla produced its first Ground Granulated Blast Furnace Slag (GGBFS) product, Ecocem, in March 2014. Impressively, after a successful start up, the MVR Gebr. Pfeiffer Mill took just 40 minutes to produce sale quality product.

The new mill is designed to grind both GGBFS and cement clinker. Further, blast furnace slag (BFS) is produced as part of the iron and steel making process next door at BlueScope Steel's Port Kembla Steel Mill where molten slag is granulated by Australian Steel Mill Services (ASMS) and processed ready for dispatch in the nearby BlueScope Recycling area.

Overall, the majority of Ecocem produced from the new mill will be utilised in ready-mix concrete. Where this product is used as a replacement for natural materials in Portland cement, greenhouse gas emissions are reduced by over 100,000 tonnes annually.



## Project Report: The Northern Road Oran Park Upgrade

The Northern Road in south western Sydney had seen a steady decline over the years, therefore, with Oran Park Village well underway and an estimated 20,000 new homes planned for the next five years, it was due time for an upgrade to a dual carriageway. This road would form part of the South Western Main Arterial Corridor, and as residential and commercial growth occurs, the traffic on this section of road is expected to increase significantly in the near future.

ASMS was contacted by a Senior Engineer with NSW Roads and Maritime Services (RMS) to discuss the potential of using our materials in the upgrade. The RMS Engineer had used slag road bases in the past with great success and was well aware of the advantages, in comparison to natural materials. After lengthy discussions, RBM800 was specified as a heavily bound base (HBB) and the tender was put forward and subsequently won by TRN Fordham.

The project commenced in August 2013 with the site preparation and bulk excavations, progressing smoothly with supply of RBM800 commencing in October 2013. The daily supply requirement was set at 1,000 tonnes per day. On the odd occasion, it was requested by site to increase this to 1,500 tonnes per day which was achieved without issue. At one point, 10,000 tonnes was supplied before Christmas, with the 10,000 remaining tonnes supplied in the second quarter of 2014.

At the end of the project, the Site Foreman commented on how impressive the "slag" experience was as a contractor. The factors of on time deliveries, the ability to place material in the rain, and the superior strength characteristics of the material made it a pleasure to work with, and he was looking forward to the next project working with slag.

For more information, please visit the ASMS website:  
<http://www.asms.com.au>





# Conference Update: Construction Materials Industry Conference 2014

The Construction Materials Industry Conference (CMIC) 2014 took place at Brisbane Convention and Exhibition Centre, South Bank, Brisbane from Wednesday 3rd September to Saturday 7th September 2014. Once again the Institute of Quarrying Australia (IQA) and Cement Concrete Aggregates Australia (CCAA) joined forces to present this signature conference for the construction materials industry with the theme being *Building Productivity*, exploring Australia's changing business environment.

The Australasian (iron & steel) Slag Association was represented during the conference in the Exhibition Hall where members and interested parties took advantage of the valuable networking opportunities available with suppliers, peers, customers and friends on a global scale.

The Conference highlights included:

- 14 Keynote Speakers, 10 plenary sessions and numerous industry awards
- 500+ Delegates networking, listening and learning from the best in the field
- 51 Exhibiting Companies
- 20 Sponsor Companies



The Komatsu Gala dinner took place that evening and was attended by over 800 participants. This was an outstanding social event where the Plaza Ballroom provided an excellent venue for the live entertainment and formal dining.

The technical program theme of *Building Productivity* was of value to key industry stakeholders including civil and structural engineers, academics, manufacturers, contractors, developers, Government Departments and Local Councils. Whether it was efficiencies in processes, improved offerings to customers, or support tools and business systems for frontline services, every aspect of the business model was challenged.

Overall, CMIC14 once again provided a platform to showcase the Association and connect with many leading industry specialists. In particular, the ASA was provided with the opportunity to promote the Association; further educate industry personnel and to increase key industry contacts.





## Conference: Global Slag 2014: Conference & Exhibition

The 10th Global Slag Conference & Exhibition will be held on 8-9 December 2014 in Aachen, Germany.

The themes of this conference will be centred on the utilisation of slag products, global trends, case studies and innovations arising within the market place. Attendees include producers, users, suppliers, academics and other key industry stakeholders.

With registration still open and located in a central European destination, in the beautiful location of Aachen, why wouldn't you attend the Global Slag 2014 Conference?

For more information, visit: <http://www.globalslag.com/conferences/global-slag/introduction>



## Conference: Concrete 2015: 'Research into Practice'

The 27th Biennial Concrete 2015 Conference, hosted by the Concrete Institute of Australia, is scheduled for 30 August until 2 September 2015 at the Pullman, Albert Park, Melbourne.

The theme, *Research into Practice*, seeks to bring together industry leaders on a global scale and will focus on concrete design improvements, research, construction, maintenance and repair of concrete projects.

This conference will also run alongside the 69th RILEM Week Conference. Interestingly, RILEM is the International Union of Laboratories and Experts in Construction Materials, Systems and Structures. Their mission is to advance scientific knowledge in relation to the construction industry and to encourage its use and application worldwide.

Call for Abstracts is currently open for potential attendees wishing to present on experimental work, R&D, practice and industry applications, case studies and innovations which may be of interest to delegates with registration opening in February 2015.

Importantly, the Association will be in attendance in the Exhibitor's Hall and encourages members to attend given the valuable opportunities available for knowledge exchange and networking with fellow colleagues. We look forward to seeing you there in support of your industry!

For more information, please visit: <http://www.concrete2015.com.au>

**concrete**  
30 August – 2 September  
Melbourne, Australia **2015**

**construction innovations:**  
RESEARCH INTO PRACTICE



## Conference: EUROSLAG: European Slag Conference

EUROSLAG, the 8th European Slag Conference, will be held in Linz, Austria from 21-23 October 2015. As over 44 million tonnes of ferrous slag products are produced in Europe each year, this Conference allows stakeholders to share their specialist knowledge, explore innovative research topics and build connections with one another.

With the Conference and technical visit organised by Voestalpine Group, the purpose of this forum is to enable the exchange of knowledge associated with technical applications, environmental and legal issues surrounding the use of this beneficial product.

Attendees include key industry stakeholders involved in processing, utilisation, marketing and research of slag products, with visitors from abroad encouraged.

For more information and to register, visit: <http://www.euroslag.com>



The European Association representing metallurgical slag producers and processors

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Connections is produced twice a year for the benefit of ASA members. Before each publication is drafted, an email is sent to all members, urging them to contribute stories that they think are of interest. The types of content we are looking for include:

- New developments or technologies
- New projects
- New employees

We also have a Member Profile section which is open to all member companies for contributions on behalf of the business in general or a specific employee.

So, if you have an idea or even some content that you think might make an interesting article for our readers, get in contact with Editor Olivia Yeatman today: [research@hbmgroup.com.au](mailto:research@hbmgroup.com.au)



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