

Editorial

Construction industry forecasters continue to portray a fragmented outlook for 2013. At a more granular level there are signs of improving prospects for one sector, a bleak time ahead for another, and the third sector set to peak soon before softening over the next decade. Broadly forecasters suggest that the next twelve months will be make or break for many businesses, from architecture and design, to building and concreting. Whilst the steel industry co-products continue to be in strong demand in building and concreting sectors, we must continue to demonstrate and differentiate the benefits of iron and steel slag products from our natural quarried and manufactured product cousins - through continued R&D, product advocacy and promotion.

In December 2012, Senator the Hon Chris Evans, Minister for Tertiary Education, Skills, Science and Research, formally launched the largest CRC since the Centre's inception. As foundation members, the Australasian (iron & steel) Slag Association understands the significant value of the CRC for Low Carbon Living and anticipates the opportunities for research and market development for the increased valued added usage of slag material in the built environment.

This edition focuses on a number of projects that involve Association members. Member company, Harsco, provides an insider into the use of their new product, *Griphalt*, which offers superior skid resistance properties for use on roads. Australian Steel Mill Services (ASMS) announced that the NSW EPA granted a specific exemption for the

use of SFS barren fines and GBFS in various agricultural applications. This exemption was granted based on favourable results provided by a DPI research report. Finally Arrium Limited provide a project update on their mining port expansion, a necessary step to cope with their increasing export business. Once again this edition demonstrates that despite the current subdued business operating environment, our members are undeterred and continue to develop their business' wherever possible.

Our member profile for this issue focuses on Independent Cement and Lime, a company that continues to supply quality products within the construction materials industry. This featured section of Connections will include other members in future editions.

In terms of upcoming industry events, the Global Slag Conference, Concrete 2013 and Australian Society for Concrete Pavements provide valuable networking opportunities for our members with like-minded industry stakeholders. As event sponsors and exhibitors at conferences including Concrete 2013 and the Global Slag Conference, we encourage our members to attend and support their industry advocate in action. A detailed summary of each event can be found later in this edition of Connections.

On a final note, the Australasian (iron & steel) Slag Association wish you a safe Easter period and all the best with your industry pursuits throughout 2013.

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Twitter Reminder



As of April 2012, the ASA introduced a Twitter feed to the Association's webpage as a powerful communication tool that provides almost instantaneous information from the ASA office to your laptop, iPad or phone. Often downplayed as a social media tool for younger generations who wish to keep up-to-date with their favorite celebrity, there is also an important function for Twitter within our Association, especially amongst our members.

As part of the Association, you have access to regular updates on relevant industry news supplied to the ASA office on a daily basis. The beauty of twitter is that any 'tweets' posted have a limit of 140 characters, ensuring that information is refined to the crucial facts that you need to know, providing important news without impinging on your time constraints.

If you don't already have a Twitter account, it is a free service that is open to the public and available at www.twitter.com. Once you have set up your account, you can 'follow' @asa_info which will subsequently display any 'tweets' on your page for your perusal. Additionally, if you have an iPad or smartphone, the twitter app is free to download, making it even easier to access industry news.

If you have any further questions regarding Twitter, please email research@hbmgroup.com.au.



Euroslag 2013

The 7th European Slag Conference will be held in IJmuiden, The Netherlands from 9-11 October 2013.

This year's conference is titled "Don't waste your secondary resources" with registration open from mid April 2013. Sponsors also include industry stakeholders such as Tata Steel, Harsco Metals Holland and Pelt & Hooykaas.

We encourage our members to attend international conferences as they are a valuable source of information as to the issues and technologies being developed in other countries. They also provide important networking opportunities by extending the ties of the ASA across our borders.



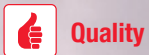
The European Association representing metallurgical slag producers and processors

Please visit their website for further details as well as the draft program: www.euroslag.com/about-us/conferences/

Established in 1987, Independent Cement and Lime Pty Limited (ICL) is a Port Melbourne based specialist supplier of cement and cement-based products to a wide variety of projects and industries throughout Victoria and New South Wales.

In a relatively short period of time since its establishment, ICL has grown to a point where it is now Victoria's leading supplier of cement and cement-blended products. It has a state of the art terminal in Port Melbourne, Victoria, and dispatches over 1 MT of cement products each year.

ICL attributes its success to its commitment to:



Quality



Service



Research and development



Independent culture

In public terms, the business maintains a very low profile, yet its products have played a key role in many of the State's major infrastructure and building projects for over three decades now.

Cement is the 'glue' that binds sand and aggregates together to form concrete, one of the key construction materials available today- second only to water, concrete is the most consumed material on earth. (Cement Federation- Sustainability Report)

It is ICL's cement that is such an important 'glue' in Victoria's building and development projects. Think of any number of major projects- Beacon Cove, the Hume Freeway, Bolte Bridge, Dockland Stadium, the Melbourne Aquatic Centre or the Desalination plant- and ICL's cement will have played a key role.

ICL's cement has been equally important to local communities through housing, commercial and office construction, as well as roads and footpaths.

In recent years, ICL's focus has shifted to sustainability, with the business investing heavily in developing products that reduce the environmental impact of the cementitious binders used in concrete. These 'Ecoblend' products as they are called, are now an increasingly important part of ICL's business and are a testament to ICL's vision and leadership in sustainability in the cement industry.



Following extensive research, development and a major investment in plant and equipment, ICL commenced production of slag, as the input product for its Ecoblend range of environmentally friendly 'cement blends' in 1991. In these Ecoblend products, conventional cement is partly replaced with supplementary cementitious materials, typically blast furnace slag or fly ash.

The introduction of these supplementary materials has had a significant impact on the CO₂-e emissions generated by cement manufacture. This has been achieved in a number of ways including:

- Ecoblend products contain a minimum 30% supplementary cementitious materials (SCMs), ie. slag and fly ash. This has significantly reduced the demand for clinker based cements and hence the requirement for the burning of the fossil fuels used in the energy intensive cement clinker production, as well as reducing the emissions that occur in the burning process itself. For each tonne of SCMs used, a reduction of 700 kg of CO₂-e is achieved.
- The use of granulated blast furnace slag (GBFS) as the cement replacer means that the slag, which is a product of steel production, is no longer considered a 'waste' and is not put into land fill.
- Ecoblend is in fact a superior cementitious product, offering increased durability or longer life, particularly in adverse environments (eg. salt water, sulphate environments, etc) meaning that the concrete will last longer, further reducing its environmental impact.

Ecoblend has in fact been so successful that ICL finds that its production facility is now at capacity- close to 250,000 t per annum- delivering a staggering saving of 160,000 t in greenhouse gas emissions each year.

ICL is now seeking to expand its production capacity, but needs the space to do so. The support of Government in securing this space will also be crucial.

To delve into product specifics, the Ecoblend range of cements are specifically formulated to reduce the environmental impacts of cementitious binders used in concrete and stabilisation products. Ecoblend uses supplementary cements such as slag and fly ash to ensure a significantly lower product life cycle impact. It provides the option of using a binder with significantly less material input, energy input and emission output hence creating a very low energy material.

These significant environment savings are complemented by Ecoblend's superior technical qualities and comes with no adverse cost implications. In fact, first and second savings are often experienced. Hence the much talked about "Triple Bottom Line" concept is easily met in adopting Ecoblend in your next project.

For further information, please visit: www.independentcement.com.au

Ecoblend - Supporting a GREENER FUTURE



**Independent
Cement**



INSIDER

The Road to Going Green in Melbourne

The road to going green in Melbourne began in 2009 when Harsco Metals took responsibility for utilisation of the slag co-product from Onesteel Laverton and entered the sphere of sustainable roads. In 2010, in conjunction with the ASA, Sustainability Victoria and OneSteel, we invited stakeholders in the value chain – VicRoads, EPA Victoria, end market users, local councils and other interested parties – to analyse EAF slag from the perspectives of energy use (“carbon footprint”) and potential end use applications for the product. This forum was designed to open up discussion regarding attitudes and understanding of slag products, to then develop a strategy for effective utilisation in Victoria.



Above: Emerald Road, Monbulk.

Ultimately, the end goal was to move EAF slags into the preferred market of asphalt products where its superior skid resistance could be utilised. To facilitate this, a lengthy testing and consultation process with VicRoads followed in order to prove the capability and potential of EAF slag materials and the associated benefits to Melbourne. Due to the limited availability of the product versus the overall market, sales were directed towards niche high performance products.

In mid-2011, Harsco Metals and Fulton Hogan began working in partnership to transfer the lab-based testing into real applications. Fulton Hogan’s technical expertise and product development abilities, combined with Harsco’s global experience in slag utilisation, culminated in the first roads being laid during 2011 and early 2012. These roads were tested in comparison to traditional materials, with impressive results. One of the applications included the Emerald-Monbulk Road (see image), where a section of slag asphalt was laid in the northbound direction, with granite asphalt in the southbound direction. A VicRoads SCRIM machine was used to perform a direct comparison between the skid resistance properties of the two materials. Results showed that the average skid resistance was 6.5 % higher for the slag asphalt when compared to granite.

In 2013, an independent report from Monash University used the results as the focus of a study into the beneficial impact of skid resistance on pedestrian injuries over the life of the road. This report recognised that EAF slag asphalt exhibits superior skid resistance properties and that these properties can be maintained for long periods, as the material regenerates new frictional surfaces. It was found that over a five year period, the slag asphalt would lose less than 1 % of that skid resistance, compared to the granite which could expect to lose almost 20 %.

These results were then used to perform a comparison between a vehicle on an urban road decelerating from 60 kmph stopping on granite and slag. Based on the skid resistance data, from the time that brakes are fully applied, the car stopping on slag travels 17 m. Comparatively the car stopping on granite travels almost 20 m. For the granite road, this equates to a collision speed on 15 kmph, at the time the car stopping on slag would be motionless. This is the impact speed at which nearly half of serious injury crashes involving pedestrians occur. It was further estimated that if the material were applied to all Victorian roads, 20 pedestrian deaths and 240 serious injuries could be prevented over a ten year period.



Above: Material being laid in Geelong for Greater City of Geelong.

To date, the product has been laid at multiple sites around Melbourne, including intersections, roundabouts, high speed corners on country roads, and school crossings. Fulton Hogan have developed a speciality product called *Griphalt* (see image) using the EAF material, which includes over 70 % recycled content. Several other sites have been identified for the product in 2013, giving Melbourne’s roads the chance to go green sustainably whilst potentially improving the safety of its users. For further information, please visit: www.harsco.com



Background: Material laid in South Melbourne.

Whyalla Project

arrium
MINING AND MATERIALS



onesteel

In Whyalla, South Australia, Arrium Mining's port expansion project is close to completion on the OneSteel Whyalla Steelworks site. However, this project also provides significant reuse opportunities for the Steelworks blast furnace slag, as a prime example of beneficial utilisation in the producer's own backyard.

Arrium Mining and OneSteel are both key businesses within Arrium Limited (formerly OneSteel Limited); which operates the integrated 1.2 MT per annum Steelworks at Whyalla as well as a successful iron ore export business.

The port expansion will increase the export capacity of the Whyalla Port to 13 MT of iron ore per year, opening a number of opportunities for increased sales from its existing iron ore operations and through the acquisition of the Southern Iron assets near Coober Pedy.

The expansion works consists of a tip pocket used to in-load the iron ore from the rail wagons and two large export sheds which are of similar size and appearance to the existing export shed on the site. The other significant part of the expansion involves laying new standard and narrow gauge rail links to connect the new export facility to the Southern Iron mine site and Arrium's existing South Middleback Ranges mines.

An expansion to the business' transhipping operation has also taken place. This included an additional transhipping vessel giving the fleet the capability to load two Cape vessels simultaneously. A new berthing facility is also being constructed in the Steelworks inner harbour.

The completed project will utilise 3,000 t of steel for the various buildings, as well as 30 km of 60 kg rail and 20,000 sleepers for the rail expansion. All of this steel is being produced by OneSteel domestically.

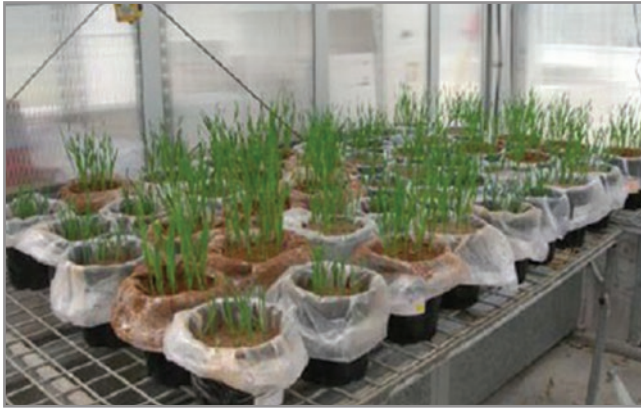
Due to the engineering properties of Whyalla blast furnace slag, over 325,000 t of blast furnace slag will have been beneficially used in the project by the time it is completed. The slag is being used as engineering fill below rail lines and as fill for the new berth. In addition, the tip pocket, conveyor towers and the two export sheds have been constructed on land that has been reclaimed progressively with blast furnace slag since the plant was established in the 1940's.

The Whyalla Port Expansion commenced commissioning operations in late 2012 with throughput being increased throughout the year. Further development works are also planned for completion during 2013. For further information please visit: www.arrium.com



SFS Usage in Agricultural Applications: ASMS Specific Exemption

A recent collaborative research project between Australian Steel Mill Services (ASMS) and the NSW Department of Primary Industries (DPI) to conduct trials on the use of steel furnace slag (SFS) in agricultural applications has been used to support the application for a specific exemption issued by NSW EPA.



The trial report, titled *Preliminary evaluation of steel furnace slag (barren fines) and granulated blast furnace slag as liming ameliorants for use in agriculture*, in summary found that SFS fines could be used as liming materials for application to acid soils. In addition, there was no clear physical barrier – as proven through a “worm avoidance test” to further research into the use of GBFS in similar situations.

Glass house pot trials on wheat grown in three typical eastern NSW soils examined the effect of SFS application on:

- Soil pH
- Plant growth
- Soil phosphorus extractability
- Soil metal extractability
- Plant available phosphates and heavy metal cations

To summarise the findings:

- Plant yield data indicates SFS compares well with agricultural lime
- The application of SFS increases soil pH and plant available soil phosphorus
- There were no actual or potential adverse environmental or food chain impacts, with
- All detectable metals appearing at well below regulatory guidelines.
- Concentration of water soluble metals were well below recommended irrigation and livestock drinking water limits
- The application of SFS had no effect on plant available phosphorus in soil or the performance of phosphorus fertilizers

This is an example of yet another beneficial utilisation opportunity for slag materials, particularly those which in the past, have not necessarily been considered as an opportunistic product, for example, SFS barren fines. For further information, please visit: www.asms.com.au



Update: CRC for Low Carbon Living

With the emergence of climate change as the biggest challenge of this century, the CRC for Low Carbon Living aims to provide the government and industry with social, technological and policy tools to motivate the use of cost efficient low carbon products and services. Statistically, this will be the largest project since the inception of the CRC, running for 7 years and due for completion in 2020.



This research seeks to fill an important void in the understanding of low carbon products where they have traditionally been thought unable to compete within the industry market due to cost and quality concerns. The built environment is a significant target for the initiatives of this CRC as the majority of low cost emissions saving opportunities are found within this area of industry. Therefore, it is because of this previous lack of understanding and pragmatism that has led to minimal development in the minimisation of carbon emission initiatives up until this point.

The main stakeholders involved in this project are those with direct involvement in the built environment industry, including the ASA with the potential for the beneficial utilisation of slag. Representatives from the University of New South Wales joined ASA members at the first National Technical and Promotion Meeting for 2013 to provide an overview of their first research project undertaken under the CRC. This initial one year project will focus on manufacturing low emission geopolymer concretes within existing standards AS 3600 and AS 5100.5. This project comes under the first of three main research programs to be undertaken over the course of the CRC:

- Program 1: Integrated Building Systems**
- Program 2: Low Carbon Precincts**
- Program 3: Engaged Communities**

The expected beneficial outcomes for this CRC include:

- A reduction in carbon emissions by 10MT CO₂-e/yr by 2020
- Projected economic benefit of over \$684 million
- Adoption of government policies and industry building models which support the 2050 greenhouse emissions reduction target for the built environment
- 88 higher degree by research students with detailed experience in the low carbon built environment

The beginning of this CRC, with the official launch taking place on the 12th December 2012, marks a new and positive attitude towards the reduction of carbon emissions. **WATCH THIS SPACE!** For further information, please visit: www.lowcarbonlivingcrc.com.au



Concrete 2013: Surf, Sun and Concrete!

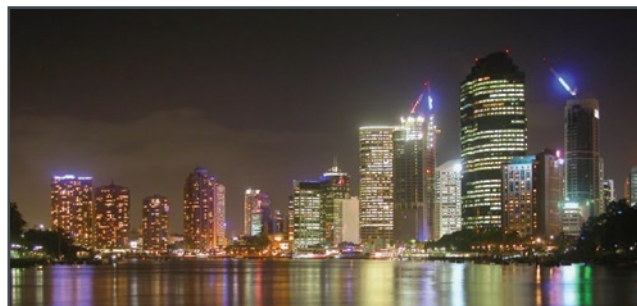


Concrete 2013, as an industry leading event in the Southern Hemisphere, will take place on 16-18 October 2013, on Queensland's renowned Gold Coast. With a location that boasts sun and surf not to be rivaled around the world, the Gold Coast Convention and Exhibition Centre places participants close to Brisbane and the beach.

The theme of this conference, "Understanding Concrete", will delve into the areas of materials, research, design, construction and innovation in a forum that facilitates knowledge share as well as valuable industry experience. Sessions will include formal presentations, industry displays and informal networking with delegates culminating in a Gala Dinner on the final evening and the Awards for Excellence ceremony.

Conference organisers have placed high importance on quality technical presentations, with keynote speakers currently being recruited from global concrete industry leaders. Abstract submissions to the Technical Committee are now open. For more information, please see: www.concrete2013.com.au/technical-program

The ASA looks forward to attending this conference and encourages members to make the journey to enjoy the benefits of this valuable technical and professional networking opportunity.



Global Slag Conference, Dubai 2013



The 9th Global Slag Conference and Exhibition will take place in Dubai, UAE, on 12-13 November 2013, and will once again be co-sponsored by the Australasian (iron & steel) Slag Association alongside other slag associations from around the world.



The conference takes place annually and examines the business of slag including: slag chemistry optimisation, slag product technology, solidified slag processing, slag product applications and slag product performance. Additionally, the conference examines global, regional and national slag product market trends. The conference is well-known for its friendly

ambience and excellent opportunities for networking and business. The conference will take place at the Westin Dubai Mina Seyahi Beach Resort and Marina, overlooking Dubai's famous Palm development. A highlight of the event is the Global Slag Awards Gala Dinner which will take place after a sunset visit to the Burj Kalifa, the world's tallest building.

The ASA - as co-sponsor of the conference - has negotiated a 20% discount on delegate registration fees at the conference for all its members and their employees. We encourage our members to attend conferences such as this due to their valuable networking opportunities for the promotion of beneficial slag use.

Please visit www.GlobalSlag.com for further details, including information on the call for papers.



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