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05

ASSOCIATION connections

australasian slag (iron & steel) association newsletter

www.asa-inc.org.au

Slag products contributing to the sustainability of the world

For much of the 20th Century the mineral and food resources of earth were seen to be limitless. One of the early warning lights came during the late 1960's from The Club of Rome, a think tank of scientists, business people and senior bureaucrats from around the world. Concerns about the shrinking polar ice caps and solar warming have brought more clearly into focus for Governments our planet's finiteness and the need to improve and or reduce our environmental footprint.

In 1987 the Bruntland Commission reviewed the rate of use of the world's resources and environmental performance in harvesting producing and using them, placing the issue of sustainability firmly on the agenda. The Brundtland Commission's Key Concepts for Sustainability 1:

Today's needs should not comprise the ability of future generations to meet their needs,

- A direct link exists between the economy and environment
- The needs of the poor in all nations must be met In order for our environment to be protected, the economic conditions of the world's poor must be improved,
- In all our actions, we must consider the impact upon future generations.

This work has given rise to the International Montreal Agreement, Kyoto protocol and Agenda 21 all based on the principle of sustainable development.

Read on for current examples of Iron and steel making rock and granulate products making a contribution to infrastructure and sustainability.

References: 1. Bruntland, G. (ed.), (1987), *"Our common future: The World Commission on Environment and Development"*, Oxford, Oxford University Press.

Iron & steel rock (slag) and granulate products have been making a significant but often underestimated contribution to sustainability in Australia for more than 50 years. Its use as cement, in aggregates and pavements, have all contributed to conserving our mined resources and in the case of cement replacement, brought significant reductions in greenhouse gas production. Many of the nations major infrastructure projects have been constructed using these materials, often chosen because of their beneficial impact on durability or placement.

Blast furnace slag cement potential to save 64.5 MT of CO^2 emissions annually

Extracted from the Abstract of a paper by Dr Andreas Ehrenberg as referenced below.

During the last years the discussions on the environmental impact of energy intensive industries, such as the production of iron and steel, chemicals and cement, and the discussions on a potential man-made climate change have increased.

The annual production of about 1690 Mt cement in 2001 caused about 9% of all CO^2 emissions world-wide. The specific CO^2 emissions depend on the type of cement. In Germany the production of 1 t Portland cement causes about 1.011 t CO^2, the production of 1 t Blast Furnace Slag Cement containing 75 wt.-% Ground Granulated Blast Furnace Slag Cement (GGBS) causes only 0.300 t CO^2. These data include the calcination process, emissions from fossil fuel burning, and the use of electricity. Only the decarbonisation of the raw materials during the clinker production causes about 0.5 t CO^2 for each tonne of clinker.

Cement is the most energy-intensive part of concrete. Therefore the substitution of Portland cement by slag cement or GGBS reduces the energy use for a typical ready-mixed concrete by about 40%. So it is evident that both common ways to use GGBS in the production of slag containing cements and the use of separately ground GGBS lead to a significant diminution of the primary energy content of building products.

"CEMENT IS THE MOST ENERGY-INTENSIVE PART OF CONCRETE."

World-wide it can be assumed that 68 Mt Blast Furnace Slag are not granulated. If this tonnage was to be granulated and used as a cement or concrete constituent, every year about 11 Mt coal equivalent (321 PJ) primary energy would be saved and 64.5 Mt CO^2

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THIS ISSUE

Connections Editorial Team
Connections is published by ASA
The Australasian Slag (iron & steel) Association Wollongong NSW 2500
Ph: 02 4225 8466 • **Fax:** 02 4228 1777
Email: info@asa-inc.org.au **Web:** www.asa-inc.org.au
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Art Director Martin Costanzo **Design & Print** Creativjuice Advertising
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WOMEN building a better industry

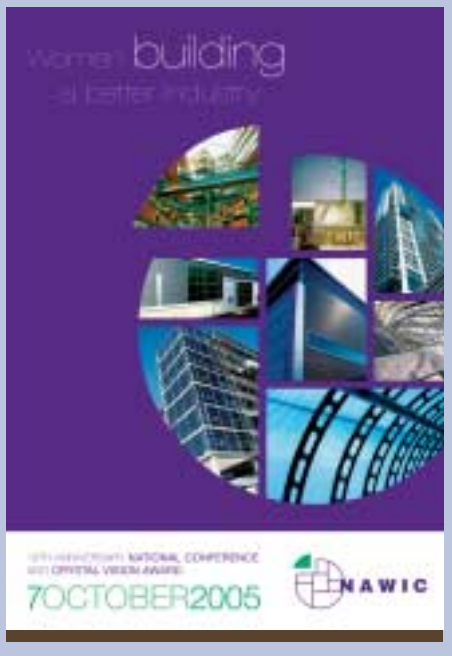
Formed in 1995, the National Association of Women in Construction aims to promote and improve the construction industry by the advancement of women in it and provide a forum for sharing ideas, networking and personal development opportunities. The association attracts membership from across all disciplines in the construction industry from trades to legal, project management and academia

In this its 10th Anniversary year, the Association is organizing a one day conference at the Grand Hyatt in Melbourne around the theme Women Building a Better Industry. Keynote Speakers include Janet Holms aCourt and there will be facilitated sessions with Robyn Henderson and Sandi Givens to "develop skills in establishing effective networks and building and managing your career".

Conference content will cover where women are, the role of women in building a better

industry, international perspectives on the industry and opportunities for women in construction. The one day conference will conclude with a cocktail party at the Ian Potter Gallery, NGV, Federation Square, Melbourne.

Conference and NAWIC details available at www.nawic.com.au.



Making the Sustainability Value Proposition for Iron and Steel Slag Product

Extracted from a paper World of Iron and Steel – a construction materials perspective – Oscar Gregory and David Jones as referenced below:

Coming from a solutions based approach to business, BlueScope Steel considers the slag produced from the manufacture of iron and steel as product for further processing into construction materials.

Increased steel production increases the supply of aggregates and cement replacements. It is time Australia recognised the "Endless Quarry" that comes from the steel industry and is capable of replacing a significant proportion of the country's cement and cement raw materials, at considerable environmental benefit.

BlueScope Steel produces 5.0 Mt iron (hot metal) and 5.2 Mt crude steel per annum. Fig 12 shows BlueScope Steel's output throughout the 1990s and the forecasted output for the next 20 years. Every tonne of iron produces approx. 260 kg of iron rock. Every tonne of crude steel produces 100kg steel (BOS) rock.

Onesteel produces 1.2Mt iron and 1.65Mt crude steel (Whyalla & Rooty Hill) and Smorgon Steel slightly less than approximately 1Mt crude steel.

These three steel producing companies supply approximately 3Mt iron and steel rock to the Australian aggregate and cement industry. In the next 20 years 60Mt rock will be produced, approximately 40Mt of this is within the reaches of the greater Sydney environs.

Increased steel production increases the supply of rock and granulate (associated) products available from the iron and steel manufacturing processes to replace aggregates and cements supplied from traditional sources. There is a long history of use of these materials in the construction industry. In more recent times the significant environmental benefits from replacing a percentage of cement in concrete with ground BF Granulate has been recognised. This is particularly so as manufacturers, construction industry customers and suppliers look to improve their "green" credentials.

The continuance of the steel industry provides a long-term supply of iron and steel slag rock and granualte products (currently around 3 million tonne per year). This is the equivalent of having an 'endless quarry' with a current 20 year projected life and beyond, a significant contribution to resource conservation. These products have been used successfully in the Australian market place since at least the 1960's.

Changing the paradigm to see these materials as products is essential to capture the environmental, social and economic benefit available. These changes have the potential to contribute significant annual greenhouse reduction. This requires a change in mindset from

> In the next 20 years 60Mt rock will be produced, approximately 40Mt of this is within the reaches of the greater Sydney environs

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RBU800 KEEPING THE PLANES FLYING

Illawarra Regional Airport/ Historical Aviation Museum upgrade (Runway/Hardstand/Taxiways)

The recently completed upgrade of Albion Park Airport will open the Illawarra region of NSW up to the greater community of Sydney and Melbourne for business and tourism.

It will allow international air events to be staged in Albion Park and open up new opportunities for large regional air carriers to establish permanent routes. Illawarra and interstate capitals and allow aircraft such as the Dash 8 and SAAB340 turbo prop aircraft to operate in interstate travel.

The Illawarra Regional Airport is located at the intersection of the Princes Highway (F6 Freeway) and the Illawarra Highway Albion Park Rail. The runways, taxiways and hardstand areas were competed with selection of Slag Base RBU800 – 80/20 material (of the same type used for the base of the Sydney International Airport third runway project dating back to 1993) in 300mm layers of up to 750mm in thickness.

Illawarra Councils and Businesses that combined to provide the necessary expertise to make this project a success included: Shellharbour, Wollongong and Kiama Councils, Cleary Bros, BlueScope Steel and Australian Steel Mill Services (ASMS).

The overall project also includes providing Historical Aviation Restoration Society (HARS) with a purpose built home for Australia's only aviation History Museum to house a first class collection of historic Aircraft many of which are still operational.

Supply of RBU800 by ASMS solves Airbus 380 problem

The introduction of the newly acquired Airbus 380 presented an issue with regards to where will it would park at Sydney Airport upon arrival.

Airport authorities specified again RBU800 as previously supplied by ASMS to the third runway since it has shown its worth over an extended time period of 12 years.

RBU800 is the popular 80/20 roadbase which consolidated its reputation on its ability to be placed under all weather conditions, ability to be stocked on site, flexibility with construction and its long term durability characteristics.

The pavement was placed on a sub grade of sand by contractor Ward Civil. The project began initially with some trial runs during March, moving into full production placement in April 2005.

[Further information – Rick Jarrett Australian Steel Mill Services]

"The overall project also includes providing Historical Aviation Restoration Society (HARS) with a purpose built home for Australia's only aviation History Museum to house a first class collection of historic Aircraft"

SLAG CONTRIBUTING TO THE KIAMA BY-PASS SUSTAINABILITY

Australian Steel Mill Services (ASMS) is currently suppling bound road base, filter materials and asphalt aggregates to the North Kiama Bypass. This major RTA project is nestled between four natural Basalt quarries.

John Holland, the principal contractor, is using 160,000 tonnes bound road base (RBM800), 60,000 tonnes sized filter material - 125mm +20mm (ABF125) and a range of sized asphalt aggregates.

The cost-effectiveness of the project is enhanced by utilising the purpose built blending plant already located at the ASMS processing site Port Kembla.

The RBM800 bound road base supplied by ASMS is manufactured from a blend of blast furnace slag and granulated slag being chosen by the RTA and John Holland because it:-

- Provides higher yield
- Requires less binder to achieve the required UCS
- Requires less compaction work
- Is able to be worked in all weather conditions
- Conforms with RTA3052

The asphalt aggregates will be used in AC10, AC14 and AC20 mixes. These asphalt blends provide higher durability, lower maintenance costs and improve road safety as proven by use in RTA identified "black spots". C

Concrete 05: Issues [opportunities] Innovations

In October this year (17th to 19th), the 22nd Biennial Concrete Institute of Australia Biennial Conference will be held in Melbourne. Conference Chairman Brendan Corcoran states that the conferences always strive to provide the most up to date information from within the concrete industry for both members and non members alike.

Theme of this year's conference is Issues [opportunities] Innovations, chosen to reflect the important issues which face the world wide construction industry today and into the future. Brendan Corcoran states that the impact of new construction on the environment, ageing infrastructure, sustainability, risk assessment and management, together with Occupational Health and Safety are a few of the issues the industry has to manage today.

The three day conference will include plenary and workshop sessions, with presentations from practitioners, researchers and invited Keynote speakers. These are W Gene Corley, Senior VP Construction Technical Labs Illinois USA; Prof Kyosti Tuuti, Lund University Sweden; Prof Doug Hooton, Uni. of Toronto Canada; Dr Kevin S Elliot, Uni. of Nottingham UK; Dr Dudley Morgan Chief Materials Engineer with AMEC Earth & Environmental Ltd.; Dr Allan Mann, Divisional Director Jacobs Babbie Group. **<www.coninst.com.au>**

membership

Company Members

A primary role of our Association is to bring together Slag Producers, Processors, Customers and 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, just complete the information section at the end of this newsletter. Current membership is as listed below.

Australian Steel Mill Services Pty
BlueScope Steel Ltd (Port Kembla)
Brambles Equipment Ltd
Brambles Industrial Services Ltd (Whyalla)
Concrite Pty Ltd
CSIRO CMIT
EcoCem Pty Ltd
Fractum ApS
Heckett Multiserv (UK)
HiSmelt Ltd
Holcim NZ Ltd
Hunter Mill Services Pty Ltd
Komatsu Australia Ltd
Multiserv Australia Pty Ltd
OneSteel Limited (Whyalla)
University of Newcastle
University of Wollongong
Premium Tyre Service Pty Ltd
Readymix Holdings Pty Ltd
Roads & Traffic Authority of NSW
Slag Cement Sdn Bhd (Malaysia)
Smorgon Steel Ltd (Melbourne)
Smorgon Steel Ltd (Newcastle)
Steel Cement Ltd
SteelServ Ltd (NZ)
Steelstone Services
Sunstate Cement Ltd
Wormald Fire Systems Ltd

Personal Members

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

Related Associations

National Slag Association (US)
Nippon Slag Association (Japan)
European Slag Association (EU)

ASA education programs and seminars – way to sustainability

A Key role for ASA is ensuring that potential users, designers, Government, Regulators and the community understand the potential of slag products to contribute significantly towards sustainability. As part of this program, members of the Association provide free guest lectures to University students, provide an on-line library resource and other on line information (at www.asa-inc.org.au) provide presentations and seminars for designers, engineers and other interested parties and run conferences such as the one in March this year.

The seminars and presentations are all tailored to suit the audience, highlighting particular products or product capabilities as requested. In these days where building and construction standards are changing towards lowering the environmental footprint of these activities the properties offered by the family of products available from Association members. Backed by years of research, development and field experience, selection of slag products can add durability, reduce CO2 equivalent emissions and conserve natural resources.

The Annual Education Awards attract students from a number of disciplines. The aim of this award is to encourage innovative uses of slag products in building and construction. It is aimed at students in their final years of study where they are invited to submit a piece of significant work for the Association Judges to review. In 2005, the award was presented to a cross discipline team from the University of Wollongong, with their review of current practices and presented to sponsors BlueScope Steel some innovative ideas for further uses and developments of slag products.

To arrange for an ASA presentation or guest lecture, please complete and fax back the form below. Information on the Education Awards can be found on the Association's website at www.asa-inc.org.au **C**

< from page 2:

producers, processors, marketers, regulators and Government for the maximum benefit.

Reference: World of Iron and Steel – a construction materials perspective – Oscar Gregory Manager Operations Services, BlueScope Steel Port Kembla Steelworks & David Jones Director / Consultant Principal – Damaur Consultants, Wollongong presented to the ASA Seminar Radisson Hotel Darling Harbour Sydney March 18 2005. **C**

asa 2005

BLUESCOPE STEEL

Bluescope cuts freshwater usage

Total freshwater consumption by BlueScope Steel sites in Australia and elsewhere was the lowest it has been in the past four years, says the company's health, safety, environment and community report for 2004. The report notes consumption at Port Kembla will drop by more than 50% as a result of the company taking 20ML treated wastewater from a new Sydney Water treatment plant. It adds that installation of a Cyclovap unit to distil clean water from wastewater at its Western Port site has cut freshwater use at the cold reduction mill by 40% to 80%. The Western Port site is aiming to reuse up to 80% of all wastewater generated on-site. Meanwhile, the $18m 'EcoCem' granulated slag grinding plant at Port Kembla is expected to ramp up to 100% capacity (200,000 tonne) over the next 18 months, bringing Port Kembla "significantly closer" to full slag reuse. The Ecocem plant began operating in 2001. The report is newly listed in the fed DEH online sustainability reporting library. www.deh.gov.au

<Source: Environment Manager Issue 531 May 24, 2005>

presentations:

A key focus of the Association is ensuring that Universities and their Engineering and Architecture students and lecturers have an appreciation of slag products. Tailored presentations are also available apon request for representatives from Engineering and Construction organizations Government Departments and Councils.

During the quarter presentations were made to:

Upcoming

- University of Wollongong
- University of NSW
- Monash University
- Australian Defence Forces Academy
- Queensland University
- Melbourne University
- University of Western Sydney
- University of Newcastle
- Australian National University

Australasian Slag Association: Technical Seminars

asa

I am interested in: *(please tick ✓)* ***PHOTOCOPY FORM AND EXPRESS FAX: 4228 1777***

❑ Receiving a presentation on: ❑ Receiving more information about:

Presentation topic areas: *(please tick ✓)*

❑ Slag in Concrete Construction and Pavement Technologies ❑ Slag in concrete construction applications – case studies

❑ Environmental benefits derived from increased utilisation ❑ Slag in road pavement, base and sub base construction

❑ Other *(please specify)*_____

Contact Name: Position:

Organisation:

Business Category:

Postal Address: P/Code:

Street Address: *(if different)*

Phone: Fax: Email: Website:

Expected number of people: Preferred times/dates: Disciplines attending:

ASMS: Robert Cignarella Commenced work with ASMS on July 13 2005, in the role of Product Manager for Concrete Aggregates, and will also further develop new markets for the Ecocem product.

He has many years' experience in ready mixed concrete with both Boral and Metromix, and more recently has been working in a sales function at Cement Australia. He is familiar with not only all the ASMS products, but also their customer base.

Robert is married to Marie, and has two children, Michael and Olivia. They live in the north-western Sydney region. Robert is a keen follower of his son's soccer team and his daughter's netball team, and is partial to the odd game of golf.

ASMS: Richard Haines – On July 8 2005, Richard Haines left ASMS after 14 years at ASMS. During this time Richard was part of the Sales & Marketing team.

Richard has contributed enormously to the development of slag products into the market, particularly in civil and roadbase applications.

He left ASMS to pursue some new challenges in the Western Sydney area. The Australasian (iron and steel) Slag Association members wish Richard all the best in his future endeavours and thank him for his contribution to the work of the Association.

Seminar Papers Available – Papers from the successful ASA Seminar held in march this year are available, along with presentations on CD and on download from our website. You can secure your copy by contacting the Association or visiting our website at www.asa-inc.org.au

AMR: New Business – Australian Metal Recovery (AMR) has recently constructed and commissioned a new stabilisation plant at the BlueScope Steel port Kembla Steelworks. The plant stabilises dry dust and wet sludge from the Sinter Plant, rendering them non hazardous for disposal.

< from page 1: Blast Furnace

emissions would be avoided. Also the mining of raw materials like limestone, clay or sand would be decreased by more than 100 Mt annually.

In using GGBS there is the initial reduction of energy costs, added to this is the technical advantages of slag cements. The use of GGBS is a well-established method to realise a real significant decrease of CO2 emissions and energy consumption.

Reference: CO^2 Emissions and Energy Consumption of Granulated Blastfurnace Slag

Dr Andreas Ehrenberg. — Forschungsgemeinschaft Eisenhuttenschlacken e. V., Duisburg, Germany — Third EUROSLAG Conference — Keyworth (near Nottingham) UK 2002 — EUROSLAG Publication No. 2—Abstracts of other papers from this conference are also on line at www.euroslag.com.

Slag – "The ultimate renewable mineral resource"

The video has proved to be very useful to many members. New additional footage has been incorporated demonstrating the beneficial properties of slag in various large-scale projects completed in recent years. The video (15mins duration) outlines slag's historical beginnings through to the various types of slag produced in a modern production process today.

Copies are available to members at a cost of $15.00 each, non-members $20.00 plus postage and handling. Just complete and fax back the subscription/order form indicating your requirements.

CD Technical Resources

ASA produces a number of high quality technical guides (i.e. the new – "A Guide to the use of Iron and Steel Slag in Roads" and the "Guide to the Use of Steel Furnace Slag in Asphalt and Thin Bituminous Surfacings") bulletins, newsletters and general industry information on current issues. The Education and Promotion Committee has developed a Technical Compendium on CD; an invaluable readily accessible reference tool for engineers, specifiers, consultants, government authorities, and slag users. *A limited number of hard copies are also available.* Copies are available to members at a cost of $15.00 each, non members $20.00 — plus postage and handling. Updated CD's will be available for registered users as new material is added. Stay up to date! Complete and fax back the subscription/order form today.

Subscription Form: Connections

I received connections via a third party, please:

❑ Add me to your mailing list ❑ Send me only electronic copies via email ❑ Send me hard copies only

I WISH TO PURCHASE: ❑ **ASA Video @ $15.00* x _____ Qty** ❑ **ASA CD @ $15.00* x _____ Qty**

Name

Position

Organisation

Mailing Address City P/Code

Telephone Facsimile

Email address

Business Category *(please tick ✓)*

❑ Producer ❑ Materials handler ❑ Industry supplier ❑ Government agency

❑ Processor ❑ Refining/value adding ❑ Specifier/Engineer ❑ Other _____

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