

association Connections

THE AUSTRALASIAN SLAG ASSOCIATION NEWSLETTER

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Editorial comment

TO INNOVATE is described by the Macquarie dictionary as to “make changes in anything established”. The slag producing and construction industries have been around for a very long time. At one level they can best be described as mature industries but they continue to innovate in response to changing circumstance. In Australia, during the last century these industries have experienced great changes in fortunes from the “island economy” for much of the century, through to the increasing exposure to globalisation from the 1980’s onwards. The opening up of the Australian economy has impacted across the spectrum. We are continually exhorted to adjust to and embrace change.

Innovation is no new thing for Australians. Technologies we take for granted including modern computers, medical science, flight, ready mixed concrete transport, and many more have been influenced by or have had their genesis in, this country. The path of innovation is however never smooth. As the definition suggests, it requires making changes to that which has been established. Whilst the need for change continues to be thrust upon us, there is a strong bias towards things that have worked in the past. This has made heavy work for the scientists and technologists, from the industries represented by the Association’s membership. They have laboured long and hard to

demonstrate the properties and advantages available from the use of slag products in the construction industry. More than 40 years of determined work by a lot of people has produced the current level of acceptance of slag products.

Towards the end of the 1990’s a new word crept into our vocabulary, ecosustainability, recognising that future development will need to meet environmental and socially acceptable goals in addition to the usual economic one. This process has been described as the triple bottom line. This can be seen in tenders that may contain some energy limitations, building codes requiring efficient use of energy and social action making the job of establishing manufacturing and processing industries more difficult.

Articles in this issue of connections highlight innovation and ecosustainability as well as recognising the work necessary to achieve acceptance. The recent publication of the Association’s “Guide to the Use of Steel Furnace Slag in Asphalt and Thin Bituminous Coatings” provides specifiers and users with technical support to innovate with steel furnace slag in construction. The Docklands project in Victoria demonstrates an acceptance of slag cements in mass concrete, to the benefit of the durability of structures. The stories in this issue point to the role of slag products in innovation an ecosustainability. **C**

EDITORIAL

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Call for new code on greenhouse gases

AUSTRALIA’S BUILDING INDUSTRY is pushing for the development of a Voluntary

Code on greenhouse gas emissions in response to national targets set by the Kyoto Protocol.

In the August 99 edition of Standards Australia’s monthly magazine, John Murray, National Executive Director of the Master Builders Australia, said the Voluntary Code would establish “best practice measures for

industry to follow and thus encourage the market to better appreciate the significance of its actions to increasing or decreasing greenhouse gas emissions”.

The code is part of a two-pronged approach being pushed by the Australian Building Energy Council (ABEC), the building industry’s peak body on greenhouse gas emission matters, to help meet the outcomes and targets set by the Kyoto Protocol, of which Australia is a signatory.

If the Kyoto Protocol is ratified and becomes legally binding, it will have the effect of limiting the growth of Australia’s greenhouse gas emissions to a level of 8% above that of 1990, to be achieved over the five-year commitment period between 2008 and 2012.

To help meet the target, the Federal Government announced it would work with the states, territories and industry to develop voluntary minimum energy performance standards for new and substantially refurbished commercial buildings.

According to Murray, “There is now the predominant view that the way forward in this area should involve a combination of voluntary

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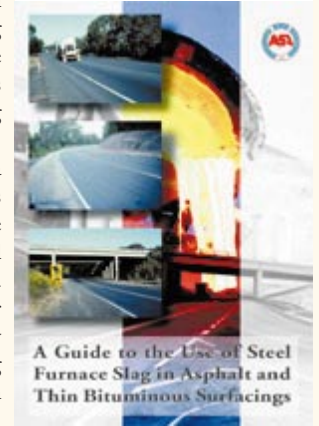
A Guide to the Use of Steel Furnace Slag in Asphalt and Thin Bituminous Surfacing

THIS GUIDE, which is supplementary to the Association's Guide to the Use of Slag in Roads, reviews in detail the use of steel furnace slag in asphalt and thin bituminous surfacings. The Guide shows that, with technical evaluation supported by field experience that steel furnace slag has in many applications, properties suitable to replace, supplement and improve other materials. The use of steel furnace slags in these ways also has

environmental benefits in allowing the conservation of depleting natural resources.

The purpose of this Guide is to provide information to designers, specifiers and providers of bituminous road surfacings on the properties of steel furnace slag aggregates so that they may be considered on an informed basis when comparisons are being made with other aggregates.

The Guide forms part of a continuous improvement process which aims to optimise the opportunities for the use of steel furnace slag aggregates. If you would like any further information or copies of the new Guide please contact Craig Heidrich - ASA Office on 02 4225 8466. **C**



Copper slag aggregates solve local supply problem

HBL (HEGGIES BULKHAUL LTD) and NRC (National Rail Corporation) have been awarded a ten year contract to move lead and zinc concentrate for Pasmenco. The major portion of the work involves the containerisation and subsequent transport of the concentrates from Pasmenco's Elura mine near Cobar to Newcastle. The containers are HBL designed, now being adopted as the standard for transport of mineral concentrates. They incorporate a lid for loading via front end loader and a tipping gate to facilitate discharge using a tipping skel trailer. At Pasmenco's Cockle Creek Smelter (near Newcastle) the containers are discharged, then reloaded with granulated lead/zinc slag for the return trip to Elura, where it is used as backfill for the mine shafts.

The infrastructure required for this contract included the construction of a large concrete pad (2800m², or 70 by 40 metres approx) with bund walls on 3 sides for stockpiling of granulated lead/zinc slag, together with a hard-stand area by the railway line to enable the receiving and reloading of containers. There was approximately 800m³ of 40MPa concrete required for the project. It should be noted at this point that there are no deposits of suitable hard rock concrete aggregates nearby to Cobar.

Cobar has a long history of lead, zinc, silver and copper mining and there was previously a large copper smelter there. Today there are huge stockpiles of copper rock slag remaining in Cobar, which are a major feature of the landscape around the town, much of the slag has been there for more than 80 years. Therefore, HBL's concrete was made with copper slag aggregate! Boral Country have an agreement in place with Peak Mines (who control the slag stockpiles) to extract, crush and screen the slag to make aggregates.

As far as I am aware, Cobar is the only place in Australia where crushed copper rock slag is regularly

used as an aggregate for concrete. By the way, it is also widely used as a sealing aggregate by the local council for maintaining both local roads and RTA highways and also as rail ballast.

Boral produce 14mm and 7mm products for their mixes, and 10mm for council road works. Craig advises that copper slag aggregate needs to be watered before use, as it seems to absorb heat, and that it is a dense product - loose unit mass is around 1750kg/m³, bulk density is around 3500kg/m³. It is also a very durable product - dry strength is around 279kN and wet strength is around 277kN.

The absorption of heat property was confirmed when I picked up a handful (it was about 35 deg in Cobar on the day I was there), the slag was almost too hot to hold! Also, visually, the slump of fresh concrete appears to be higher than actual.

Gary Radford and Sons (from Broken Hill) were awarded the contract to construct the hard-stand and stockpile areas. They batched the 800m³ of concrete using their own mobile plant. Boral supplied the slag aggregate and local sands were used. MBT designed the mix, which performed very well in terms of workability, finishability, and compressive strength. We believe this was the largest concrete pour for some time in this part of the world! For more information please contact HBL - Andrew Kemeny on 02-4640 9448. **C**



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In summary, the use of slag cement reduced the rate of heat generation in concrete and the extent of temperature rise, thus reducing the risk associated with thermal cracking and the structural failure.

Melbourne Docklands Stadium

THE DOCKLANDS STADIUM which is now due for completion in early 2000 is likely to perpetuate Victorians love of sport well into the next century. The stadium, costing an estimated \$430 million, is the first project in the long term redevelopment of the Docklands precinct on Melbourne's waterfront.

Work on the \$430million stadium started twenty months ago, and nears completion for the 2000 AFL season. About 1600 car spaces will sit beneath the pitch – with a half-metre slice soil and turf on a concrete slab presented a number design problems for engineers.

Retractable seating enables the lower tier of

specified and favoured the use of a slag blends to overcome heat problems associated with the required large mass pours.

Slag blended cements currently available in Australia contain 20-40% slag for general construction and 60-70% slag for applications which require reduced heat of hydration. Furthermore additional benefits arising from the use of slag blended cements are increased resistance to the ingress of chloride ions (sea and salt water penetration), improved sulphate resistance (attack by "high acid" soils) and to inhibit alkali-aggregate reaction. Cement with a




seating to be pushed forward 18 metres for different sports and entertainment. Seating tiers will be steeper than those at the MCG, bringing people closer to the action. It will take only 12 hours to change the stadium for different sports or shows.

The stadium, being built by Baulderstone-Hornibrook and designed by Daryl Jackson Bligh Lobb Sports Architecture, will possess one of the world's largest sliding roofs (100 metres by 160 metres). It will be built in sections and jacked up and over the stadium when ready for installation. The project will consume some 85,000 cubic metres of concrete.

More conventional challenges confronted by the builders and designers were those regarding the large concrete mass structures required for lift wells and walls. Melbourne based Independent Cement and Lime (ICL) and Barro Group

high proportion of slag is particularly useful for concrete in a marine environment such near oceans and salt water inlets and rivers.

In summary, the use of slag cement reduced the rate of heat generation in concrete and the extent of temperature rise, thus reducing the risk associated with thermal cracking and the structural failure.

Victorian sport lovers can be assured that their favourite weekend viewing platform will last well beyond the next generation. For further information please contact ICL on (03) 9646 4983. 



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 Cement Ltd
- Australian Steel Mill Services Pty
- Australian National Industries (ANI Comsteel)
- BHP Flat Products
- Blue Circle Southern Cement Ltd
- Boral Concrete & Quarries
- Brambles Equipment
- Brambles Industrial Services (Whyalla)
- Cleary Bros (Bombo) P/L
- CSIRO
- CSR Readymix Group
- University of Wollongong – Dr Denis Montgomery
- Finlay Screens
- Gough & Gilmour
- Heckett Multiserv (UK)
- HBL (Heggies Bulkhaul Ltd)
- Kress Corporation
- Mahaffey Associates
- Metserv Australasia Pty Ltd
- Millburn New Zealand Ltd
- University of Newcastle – Mr Brian Heaton
- Nichimen Australia Limited
- NS Komatsu
- Pioneer Construction Materials
- Premium Tyre Service P/L
- Queensland Cement Ltd
- Roads & Traffic Authority of NSW
- Slag Cement Sdn Bhd, Malaysia
- Smorgon Steel
- South Coast Equipment
- SsangYong Cement (S) Ltd, Singapore
- Steel Cement Ltd
- Steelstone Services (Aust)
- Sulphide Corporation P/L
- The Slag Reduction Company (NZ) Ltd
- UBE Industries Ltd
- Wormald Fire Systems

Personal Members

- Anderson L
- Butler W B
- Dobson G
- Jones D E
- Maric M
- Marosszeky M
- Prosser S D
- Reeves C M

Related Associations

- National Slag Association
- Nippon Slag Association

BOS Slag Project Boosting local Economy *and Port Potential*

STARTING BACK in 1998, the Ports Corporation undertook a major expansion of the Port Kembla Port facilities in a joint project with BHP. The project now nearing completion could see the creation of hundreds of jobs and an economic boost to the port worth millions.

The project has seen the Port Kembla Port Corporation and BHP Integrated Steel work together to fill in the casting basin and prepare a further 30 hectares of port side land using over 1.5 million tonnes of BOS slag. The project has

provided new port land ready for development and cargo storage as well as catering for the future westward extension of the current Multi Purpose Berth.

In construction alone the project has generated up to 30 jobs. Over the medium to long-term, the expansion is predicted to create up to 100 direct jobs which will have a flow-on employment effect in the broader community.

The 40 hectares of vacant land will offer many short to medium term opportunities for new business to establish in the Port. These include a niche container terminal, break and dry bulk cargo handling facilities, car import and pre delivery facility, warehousing and other cargo value adding facilities.

Recently the Port Kembla Ports Corporations MD, Philip McGavin announced the securing of a trial import of motor vehicles, in what is hoped to be the first in many new business opportunities for this new redevelopment project.

BHP and local slag processing contractor ASMS have again demonstrated another excellent application for BOS slag produced within the Steelworks. This was a commercially viable, environmentally acceptable project which has the support of the community. **C**



from cover story

and mandated approaches. 'What this means is that there should be the development of mandated standards within the Building Code of Australia to eliminate industry "worst practice", "he said".

At the same time, however, a Voluntary Code of Practice should also be developed to enable designers and consultants to specify energy-related products, optimise performance by industry and lead to 'whole of life' decisions being implemented.

'It is the ABEC's view that such a code will produce economically viable and practical actions

into all facets of building and that by concentrating on performance based issues, it will result in a cascading effect from the larger firms to smaller builders and operators.'

Another option that is gaining popularity is to separate out the energy services in a building from the development financing. This lowers the initial development cost and allows more efficient energy services (lighting, hot water, air-conditioning, lifts etc) to be factored in over the life of the building by a third party service provider. **C**



Slag - "the ultimate renewable mineral resource" video has proved to be a favourite with many members. A considerable amount of 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.

Since our last issue we have had to produced another 100 copies to meet further demand. 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.



Given the number of high quality guides the ASA has produced, and continues to produce ("Guide to the Use of Steel Furnace Slag in Asphalt and Thin Bituminous

Surfacings") together with bulletins, newsletters and general correspondence, the Education and Promotion Committee have developed a Technical Compendium for the purposes of storing these important documents and more.

The Compendiums are an invaluable reference tool for engineers, specifiers, consultants, government authorities, and various slag users. Copies are available to members at a cost of \$15.00 each, non members \$20.00 plus postage and handling. Please note that as amendments are made to the contents of the compendiums, registered holders will receive updates. Just complete and fax back the subscription/order form indicating your requirements.

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