



THE SOUTH AFRICAN COAL ASH ASSOCIATION (SACAA)

No 28, February 2010

ASH @ WORK

COMMUNIQUÉ OF THE SOUTH AFRICAN COAL ASH ASSOCIATION

from your Editors and President of the SACAA

Editorial

With this first issue of the new year we wish all our readers a successful 2010, with lots of good fortune and minimal stress! We also would like to encourage you all to submit information on new technologies, on interesting happenings, on relevant company developments to us for inclusion in ASH @ WORK, so that the ash community can share in and benefit from these developments. The address for communications appears at the end of this newsletter. So, please keep communicating!!!

There is the usual feedback on the Council's deliberations and the last Technical Meeting. On the technical side there is some information on fly ash use in the Gautrain project and on a couple of applications in the USA. We have also included some information on the expansion of local coal mining, the prime source of ash after conversion.

Council Matters

The 92nd Council meeting was held at SAI CE, Midrand on 18 November 2009.

The Council is still actively engaged in establishing contacts within the Department of Environmental Affairs in order to achieve a positive view on the environmental merits of ash utilisation. The compilation of a compact

informative paper on the virtues of ash is being considered that could serve as a tool with decision makers. Also, closer involvement with the country's foremost coal ash generator, Eskom, is being pursued.

On the topic of local ash research the Council hopes to obtain inputs from the country's tertiary institutions and research organisations as to the type and number of projects that are conducted on ash-related research. Hopefully a database can be generated from this, which should assist in directing the country's research efforts and, at the same time, stimulate the interests of the younger generation in this area.

With regard to the latter it is envisaged to annually honour the best research paper of a young scientist/engineer, provided funding can be generated.

In similar vein the compilation of a CD detailing the current status of coal ash as a cement extender in South Africa is under consideration.

The next Council meeting is set for 10 February 2010 and SACAA's members are urged to submit their ideas and proposals for the enhancement of activities to the Administrator.

Feedback: SACAA Technical Meeting, 18 November 2009

Mr Hennis van Zyl, Marketing Manager Lafarge Readymix South Africa, gave an illustrated presentation, including a short video screening, on **The Effects of Fly Ash on Self Compacting Concrete**. There were some case studies of recent applications which demonstrated the virtues of fly ash. The presentation ended with a lively question and answer session. This was followed by networking interactions over refreshments sponsored by Lafarge.

Some Local News on Fly Ash *(source: Concrete Trends, Vol 12, No 4, Nov 2009)*

Under the heading **Classified Fly Ash contributes to world-class Gautrain Concrete**, Cyril Attwell, the research manager at Murray & Roberts (a Bombela Civils Joint Venture -BCJV partner) remarks as follows:

"Traditionally, a high-productivity precast yard uses CEM I 52.6 or 42.5R cement. However, when the Gautrain project was 'building up a head of steam', the local construction industry was experiencing peak demand and there was insufficient availability of those grades, which in any case would not have been as cost-effective. After two months of trials using a foundation of advanced recrystallisation (ARC), a South African-developed technology attributed to Attwell, a 30-35% DuraPozz® concrete mix was used. Fly ash does not generally give high early strength but, by getting the other materials right, an accelerated mix was achieved that allowed the moulds to be turned around within 12-18 hours, obviating the need for steam.

Getting compressive strengths in the region of 30 MPa within 24 hours using 30-35% fly ash replacement with 300 kg/m³ of CEM I cement, 140 kg fly ash and approximately 200 litres of water is generally considered impossible. However, BCJV is achieving the 24-hour strength and averaging 28-day strengths of 74 MPa in winter! To match this, a precast business would normally expect to use 400 kg/m³ of a CEM I 52.5R cement."

"Old concrete technology relied purely on water : cement ratios with very limited account taken of the other materials, even though they make up 60-70% of the mix," says Attwell. "Our approach is to look at mechanical and chemical properties of the total ingredients: we consider voids content and how different sizes fit together, as well as the chemistry of how the fly ash interacts with dolomitic materials. There is no linear trend; each mix must be engineered separately. Our 15 MPa design has the best synergy of all our mixes; after numerous development revisions, it is currently using 30% DuraPozz® and achieving 40 MPa at 28 days. There are other sources of fly ash but they are not as reactive or consistent as this product, and only Ash Resources could guarantee product availability, which is vital for a project of this size."

When the construction of the Sandton Station is discussed it is pointed out that:

"There are no precast elements in the station, everything has had to be done on the site with 200-250m³/day of readymix, using Attwell's fly ash 'synergy' mixes, delivered from the Bombela batch plant at Marlboro and pumped into place. The completed station, including the diaphragm walls to the various shafts will require 65 000 m³ of concrete. The slabs have been poured using 40/50 MPa mixes and the diaphragm walls were built by a subcontractor using specialised German machinery

According to Peter Bredahl, BCJV's senior contract manager for Sandton Station, "we are using wooden shuttering and the results from the fly ash concrete mixes have been exceptional". Bredahl's team poured the foundations, piers, decks, columns and, in spite of the difficult supply logistics, constructed one shaft by sliding. 'The underground slide was an interesting first for me', says Bredahl".

With regard to the Centurion Station, Ian Connellan, BCJV's senior contracts manager said, "We have had to put down close to 100 000 m³ of grouting using a CEM I cement and fly ash mix for good pumpability, together with bentonite. Aesthetics are also important on the prestigious and very visible project. The fly ash has given excellent workability while reducing bleeding, contributing to good off-shutter finishes that require minimal rubdown".

Attwell concludes:

"Although the huge scale of the increasingly visible concrete structures of Gautrain is impressive, behind the scenes the achievements on reducing the project's carbon footprint have been equally impressive. I am speaking as a committed environmentalist who is very aware that cement is the second biggest contributor to greenhouse gases in the world. Creative management of three materials in particular on Gautrain has achieved enormous environmental benefits. Unusually for a project of this size and pressured timeline, more than 90% of the spoil from tunnelling and blasting is crushed at BCJVs Marlboro site and reused as aggregate. Wash water recycle has not only saved water cost and the environment but the suspended materials in the water gain us about 4 MPa and a corresponding saving in cement. Thirdly, the use of fly ash throughout our concrete mixes has made a major contribution, being a recycled waste product from power stations and an excellent cement extender."

Some Ash News from the USA *(source: www.smartash.info)*

❖ **EPA Delays Coal Ash Decision** *(EPA 12-17-2009)*

EPA's pending decision on regulating coal ash waste from power plants, expected this month, will be delayed for a short period due to the complexity of the analysis the agency is currently finishing.

As part of the commitment to ensuring the protection of public health and the environment regarding coal ash, the EPA Administrator has set a deadline to complete the regulatory decisions. However, the agency is still actively clarifying and refining parts of the proposal.

❖ **Update from Richard Kruger**

On 27 January, 2010, the American Coal Ash Association (ACAA) met with the EPA Administrator and senior staff members. This meeting was to discuss potential disposal regulations with the senior executives of organisations directly involved with the beneficial use of coal combustion products (CCPs).

Testimony was provided by each ACAA representative, including evidence that firms with competing materials are now using negative labels against CCP marketers, casting a shadow on the safety of CCPs. The team emphasised the reluctance and refusal of investors based on potential litigation exposure. The agency was reminded that regulation which affects markets will have a dramatic impact on CO₂ emissions potentially adding millions of tons of emissions to the atmosphere each year.

The EPA expressed its strong support for specific beneficial uses – notably cement and concrete. They expressed reservations about unconfined uses in structural fills. They said they would work with the ACAA to ensure preferred beneficial uses go forward no matter what regulatory path is taken.

❖ **Studies of the Tennessee Ash Spill** *(The Appalachian 11-12-2009)*

Geology Professor Roy C Sidle has received approximately \$80 000 from the National Science Foundation (NSF) to conduct research evaluating the downstream impact of the coal fly ash spill in Kingston, Tennessee. An earth dike at Tennessee Valley Authority's Kingston power plant that held sediment for over 50 years gave way on 22 December 2008, releasing roughly 1.1 billion gallons of coal fly ash slurry into the Emory River. The volume of the spill characterises it as the largest in United States history.

❖ **Developer of Chesapeake Golf Course Made with Fly Ash Speaks Out**

The developer of a golf course, made with coal ash, speaks to TV cameras - against the advice of his lawyer - for the first time about the lawsuit against his company. "My reaction to the lawsuit is that it contains more fiction than a Harry Potter novel." Neil Wallace is talking about the \$2 billion dollar lawsuit claiming coal ash used to create the Battlefield Golf Course in Chesapeake is contaminating ground water with toxic metals.

Environmental - National Ambient Air Quality Standards

The national ambient air quality standards were published on 24 December 2009 (Government Gazette 32816). These standards are for sulphur dioxide, nitrogen dioxide, particulate matter, ozone, benzene, lead and carbon monoxide. The Government Gazette will be available on the NACA website under the "Legislation" tab.

Coal Mining Developments

(Source: Mining Weekly, 23 October 2009 and AfriCoal Energy Review, No 001, November 2009)

Developments at SASOL

Sasol Synfuels is in the process of a 4% expansion while the prefeasibility into additional 16% growth is under way. The two expansions combined will put an additional 20% onto Sasol Synfuel's already burgeoning capacity of 160 000 bbl/d of transport fuel.

The company also has coal assets in the Free State, where the original Sasol One was established in 1950, and in Limpopo province, where it is conducting a prefeasibility study into the building of a fourth Sasol, which had been code-named Project Mafutha; Mafutha being the Zulu word for 'oil'.

In preparation Sasol is developing new sources of coal:

- Thubelisha Mine to replace Twistdraai Colliery, production to start in 2012
- Impumulelo Mine to replace Brandspruit Colliery, production to start in 2014
- A still-to-be-named mine will replace Middelbult Mine between 2015 and 2017, production to start in 2015.

Strategic Natural Resources (SNR) achieve first revenue from coal sales

Coal sales by SNR during the financial year that ended on 31 August 2009, were worth US\$0.12M. This is expected to ramp up in the second half of 2010. SNR's operating loss decreased to US\$0.23M during the reporting period. Progress was reported on its power supply agreement with Independent Power South Africa (Ipsa). Ipsa has finalised an option agreement for the purchase of a building site for the mine-mouth power plant. The power supply agreement secures 1Mt/a of thermal coal over a 20 year period.

Coal of Africa (CoAL) to acquire NuCoal Mining

CoAL has indicated its intention to acquire South African junior NuCoal Mining for R715M. This positions CoAL for a long-term supply of coal to Eskom's Hendrina power station which is situated in close proximity to NuCoal's Woestalleen Colliery and CoAL's Mooiplaats project. NuCoal has invested R150M in the Woestalleen project in order to boost production capacity from its present 120kt/month to 350kt/month. CoAL is an AIM/ASX/JSE listed coal development company.

NEWS SNIPPET



Happy Event

On Friday evening 8 January 2010, Karen Surridge, a Council Member, married Norman Talbot in Pretoria.

The wedding was followed by a reception overlooking the Silver Lakes Golf Course.

Karen and Norman have been dating for 6 years before Norman made his bold move !

In the photo on the left is the happy couple flanked by Karen's parents, Tony & Joan Surridge.

The SACAA and its Council Members wish them well as they embark on their future life together.

FORTHCOMING EVENTS

SACAA Technical Meeting, at SAICE, Midrand, 10 February 2010 at 15:00

Presentation by **Mr Bryan Perrie**, Managing Director, Cement & Concrete Institute, on:

Ultra Thin Concrete Pavements and an Overview of the Gauteng Freeway Improvement Projects

5 day International Environmental Auditor Course, Carnival City, 8 - 12 March 2010

Information: crystal.clear@mweb.co.za

4th International Cement Trade conference, 20 April 2010, Istanbul, Turkey

Conference website: www.cementtrade.net

Moscow Power Engineering Institute, Ash Workshop, 22-23 April 2010, Moscow, Russia

Conference website: www.ecopower.ru

EuroCoalAsh Conference 2010, ECOBA Meeting, 26-28 May 2010, Copenhagen, Denmark

EuroCoalAsh serves as synonym for a series of European conferences to highlight the use of CCPs as valuable raw and construction materials in the European construction industry.

Website: www.ecoba.org

International Conference on Sustainable Construction Materials, June 2010, Ancona, Italy

15th World Clean Air Congress, 12 to 16 September 2010, Vancouver, British Columbia, Canada

Congress theme: **Achieving Environmental Sustainability in a Resource Hungry World**

Congress website: www.uappa2010.com

International Conference on Material Science and 64th RILEM Annual Week, 16 October 2010, Aachen, Germany

Conference website: www.matsci2010.rwth-aachen.de

FROM SACAA's PAST - 10 years ago

Japie Krüger had been corresponding with Graeme Hastie of Gold Star Cement in New Zealand who had enquired about fly ash. Japie had sent him copies of the ash booklets along with other info
[Source: Minutes of the 50th Council Meeting]

Editorial comment: Even then SACAA operated internationally !

TO THE FUTURE →

Japie has been approached to update the information on the very successful CD "South African Fly Ash: A cement extender" to take cognisance of development over the past 10 years. To ensure the technical relevance, all corporate members will be approached to supply information

Editorial comment: This is your opportunity to promote Fly Ash !!!

YOUR SACAA COUNCIL

Elected Members:

Richard Kruger (President)
 Wayne Truter, UP (Vice President)
 Dieter Heinichen (Treasurer/Administrator)
 William Burtone, PPC
 Karen Surrige, UP
 Sabine Verryn, XRD Analytical and Consulting

Corporate representatives [& alternates]:

Afrisam:

Mike McDonald
 [Amit Downerangen]
 [Eunice Mguqulwa]

Ash Resources:

Matthew Reynolds
 [Andrew McKeen]

C&CI:

John Goodman

Eskom:

Tyrone Singleton

Lafarge SA:

Lebogang Mandiwana

PPC:

Eduardo Auger
 [Walter Wirth]

Sephaku Ash:

Hennie van Heerden

Ulula Ash:

Theresa Gilmore
 [Mark Hovy]

The editorial team welcomes any information for publication in forthcoming **Ash@Work** newsletters.

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Disclaimer: *The views expressed in this newsletter are not necessarily those of the Council of the South African Coal Ash Association*