



THE SOUTH AFRICAN COAL ASH ASSOCIATION (SACAA)

No 24, February 2009

ASH @ WORK

COMMUNIQUÉ OF THE SOUTH AFRICAN COAL ASH ASSOCIATION

from your Editors and President of the SACAA

Editorial

This is the first issue in 2009 and we hope all members are in full swing in spite of the rather depressing global economic situation.

We report on the Council's activities and give some feedback on the last Technical Meeting, "The response of the Cement Industry to the Waste Bill and it's wider implications" held on 11 February 2009.

There is some news on TVA's accident with an ash dump in the USA, some local and overseas news on ash utilisation and on nanotechnology. We can report that our Council member, Wayne Truter, has recovered from the surgical procedure and is on the mend.

Council Meeting

The 88th Council meeting was held at SAICE, Midrand on 11 February 2009. The main issues arising from the meeting were:

- Jean-Bosco Kazirukanyo has left Afrisam and resigned from Council. He will be missed, but we are fortunate to have Paul Botha from Afrisam nominated to serve on Council.
- The review of the Association's finances, midway into the financial year, revealed that we are on budget.
- The policy of charging non-Members, attending SACAA technical meetings, a fee of R 50 pp was implemented.
- Promised sponsorships should see us through till the end of this financial year.
- The next Council Meeting is set for 1 April 2009.
- The date for the Workshop/Seminar on Clean Development Mechanisms (CDM is the latest buzzword!) has been set for the morning of Friday, 17 July 2009. Details are in the planning stage, with Wayne Truter at the helm.
- The date for the 2009 AGM of the Association was set for Wednesday, 26 August 2009.

Feedback - SACAA Technical Meeting 11 February 2009

Lecture: "The response of the Cement Industry to the Waste Bill and it's wider implications"

SACAA's member, Egmont Ottermann, Secondary Materials Manager, PPC, shared the experiences with the implementation of the Waste Bill. The talk discussed the impact of the envisaged legislation on the cement industry with special focus on the use of waste-derived supplementary raw materials (boiler ash, fly ash) and fuels (tyres).

A successful novel, pro-active approach was followed in the mutual interaction between industry and the licensing authority. It led to the development of a decision-matrix to manage the permitting of waste materials for cement manufacture. This approach could be beneficial in other similar situations.

The interesting meeting, sponsored by Ulula Ash (Pty) Ltd, concluded with lively discussions over refreshments.

TVA Ash Dump Accident

The Tennessee Valley Authority (TVA) is the USA's largest public power provider and is completely self-financing. TVA provides power to large industries and 158 power distributors that serve approximately 9 million consumers in seven southeastern states. TVA also manages the Tennessee River and its tributaries to provide multiple benefits, including flood damage reduction, navigation, water quality and recreation.

The TVA suffered the worst-ever spill of coal ash in the USA when one of the three ponds at the Kingston Power Station failed and released approximately 4 million m³ of ash slurry into the environment. Estimates suggest that 400 acres of the surrounding terrain was affected. Three houses were rendered uninhabitable and a further 22 evacuated. Fortunately no people lost their lives. Ash was also spilt into two rivers killing a tremendous number of fish.

The 40 acre unlined disposal pond at Kingston is surrounded by 18 metre high earthen walls. The site received 180 mm of rain during the 3½ weeks prior to the disaster. Allied to the freezing temperature of -11 °C this tremendous amount of precipitation was identified as the cause of the collapse.

Obviously this spill has caused a furore in the USA and is bound to impact on the use and disposal of coal ash throughout the world.

Despite frantic effort by TVA (slowing water flow and dredging the river) there was considerable environmental damage. It is to be expected that the political and economic fallout is going to be huge. Greenpeace has asked for a criminal investigation, landowners have filed a \$165 million dollar lawsuit. Erin Brockovich was invited to view the disaster site for her opinion and further court action against TVA can be expected.

The US Environmental Protection Agency is reviewing the methods used for coal ash disposal. In the light of the spill the TVA would be considering a switch to dry ash disposal.

Source: <http://www.tva.gov/> and private communication

[Editorial comment: How safe are ash and mine dumps in South Africa?]

Ash Usage in Full Swing

In the November 2008 issue of CNCI's publication *Concrete Trends* (p 54), Lafarge's new product **Rapidcem**, South Africa's first CEM II 52.5N cement, is discussed. According to Ilse Boshoff, Lafarge's national marketing manager, "*Rapidcem* has been developed as a superior performance cement with an innovative formulation that meets the high early strength requirements of the precast industry and large construction environments. *Rapidcem* is a CEM II /AV 52,5 portland fly ash cement (in accordance with SANS 50197-1) containing Portland cement clinker and 15% siliceous fly ash from Ash Resources, which is inter ground with the clinker, together with a strength enhancer. Customised on-site concrete mixes can be formulated by further blending with fly ash, silica fume and ground granulated blast furnace slag."

Another Novel Application: Mitigating the use of fertiliser as an explosive

"Unfortunately, despite its beneficial and critical role in agriculture, ammonium nitrate (AN) fertiliser has become a vehicle for disseminating chaos and is widely recognised as one of the most significant terrorist threats to society. When mixed with fuel oil, AN creates a powerful explosive, (ANFO), whose destructive power has been graphically demonstrated in a number of notorious attacks including the Oklahoma City bombing, killing 168 people, the Marriott Hotel in Jakarta, and the Sari Club Discotheque in Bali. ANFO is a deadly weapon of choice for acts of terrorism due to its relatively low cost, ready availability, ease of assembly, and magnitude of destructive force unleashed upon detonation.

Prior attempts to lessen the threat posed by AN have included the proposed addition of desensitising agents, diluents, or the use of water-soluble coatings and hardened particles to suppress the absorption of fuel oil. Other recommendations have included substitution of calcium nitrate or urea for AN. However, none of these measures have been successful due to a combination of ineffectiveness, cost, and undesirable side effects.

Under the leadership of Darrell Taulbee, the Center for Applied Energy Research (CAER) at the University of Kentucky has been investigating the use of coal combustion products as potential desensitising agents for AN.

They developed a process by which fly ash can be fixed as an exterior coating thereby diluting the AN and preventing the propagation of the explosion.

The process by which fly ash is applied as an exterior coating on AN prills (small spheres) is both simple and inexpensive, relying on a drum roller and a small amount of water (or water and bentonite) to serve as a glue to improve coating integrity. Under optimised conditions, coated AN particles have been produced that exhibit good attrition characteristics, a particle size distribution and bulk density that appear suitable for use in existing fertiliser-application equipment, and in limited evaluations, a nutrient-release rate that is similar to uncoated AN.

Evaluation of fly ash blast mitigating efficacy required that the coated AN particles be detonated in a series of field tests. The detonations were filmed with a high-speed camera. Results revealed that a 20% fly ash coating was sufficient to stop the propagation of the AN explosion even when the coated particles were crushed prior to detonation.

Ammonium nitrate is primarily a fertiliser and any processing should not influence its properties. The good news is that in irrigated soil tests, nutrient nitrogen was released at approximately the same rate from the coated AN as from uncoated AN.

The results further indicated that the coating technology appears to offer a practical and cost-effective means to eliminate the threat posed by ammonium nitrate fertiliser. However, a number of questions remained unanswered at the conclusion of this investigation which are now being addressed in an expanded continuation project. The project is being conducted in collaboration with a team of university and industrial partners including two US manufacturers of AN. It focuses on a number of topics including an evaluation of the impact on plant growth and trace element uptake; trace element leaching and soil migration; demonstration of commercial feasibility and the development of realistic commercial-production cost estimates; and independent verification of detonation results. At the conclusion of this continuation project, the expectation is that coating AN fertiliser with low-cost CCBs is a viable and effective weapon available for use in the on-going fight against terrorism.

Source: Darrell Taulbee, University of Kentucky, Center for Applied Energy Research (CAER)
[Editorial comment: In South Africa we have limestone ammonium nitrate fertiliser known as LAN, with full or partial replacement of the lime with fly ash would we then have FLAN ?]

NanoAfrica2009

From 1 to 4 February the 3rd Biannual South African Nanotechnology Initiative (SANI) Conference, NanoAfrica2009, was held at the CSIR International Convention Centre, Pretoria. There were about 200 participants from twenty countries.

The world over nanotechnology is an emerging and growing research field. It involves controlling matter on an atomic and molecular scale. Generally nanotechnology deals with structures of the size 100 nanometres or smaller, and involves developing materials or devices within that size range. Nanotechnology has the potential to create many new materials and devices with wide-ranging applications, such as in medicine, electronics, and energy production.

A poster presentation by N. Musyoka, "***Optimisation of Hydrothermal Synthesis of Zeolite-P from Coal Fly Ash***", at this conference bears testimony to the fact that the fly ash research community recognises the potential of nanomaterials.

Source: CSIR website

[Editorial comment: What is fly ash's future in nanotechnology?]

LAST SNIPPET

- According to the conference website, Pierre Blaauw, Chief Economist, **South African Federation of Civil Engineering Contractors (SAFCEC)**, will be a speaker at the Tunisia conference.
 - One of SACAA's newest members, Dr Leslie Petrik, also gave a paper at NanoAfrica2009, **Characteristics of Platinum Group Nano-alloys On Carbon Nanostructured Materials**, and chaired one of the sessions. Well done!
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FORTHCOMING EVENTS

SACAA Technical Meeting, SAICE, Midrand, 1 April 2009

Carbon capture and storage in South Africa, by Dr Tony Surridge of SANERI, at 15:00.

Africa CemenTrade, Sheraton Tunis Hotel & Towers, Marhaba, Tunisia, 28 - 29 April 2009

Centre for Management Technology, Singapore, e-mail: hafizah@cmtsp.com.sg

Website: www.cmtevents.com

World of Coal Ash (WOCA) 2009, Lexington, Kentucky, USA, 4 - 7 May 2009

A call for papers has been sent out by the American Coal Ash Association (ACAA).

Website: www.worldofcoalash.org

Green Building Conference 2009, Sandton Convention Centre, 7 - 8 July 2009

"In 2009 the Green Building Conference and Exhibition will come of age by becoming a fully fledged 'construction industry show.'"

Website: www.greenbuilding.co.za

International Coal Ash Conference and Exhibition, Yanxiang Hotel, Beijing, China, 15 - 16 October 2009

Organiser: China Building Materials Federation

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IN THE NEXT ISSUE

We hope to look at a topic suggested by our readers. **Please send in your contribution !**

YOUR SACAA COUNCIL 2008/9

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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*