



International Symposium on Lead and Zinc Processing



Lead & Zinc 2008



The Melody

**Cruiseline Symposium
Durban to Bazaruto Island
and back**



25–29 February 2008 · Durban Harbour

Final Circular

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Invitation from the Organising Committee

On behalf of the Conference Committee, SAIMM invites you to attend the Lead & Zinc 2008 Symposium, which will be held from 25–29 February, 2008 in Durban, South Africa. This Lead & Zinc 2008 Symposium is the ninth of its series and it continues to provide an international forum for presentation and discussion on recent and future developments in the lead and zinc industry. This time the event takes place aboard a luxury cruiseliner *The Melody*. A number of invited and contributed papers will be presented. The authors were selected from around the globe. Among the accepted papers, about 70% are from outside South Africa. These papers cover the latest development in zinc processing and recycling technologies.

The 21st century poses enormous opportunities, as well as severe challenges. The conference will provide extensive opportunities for comprehensive technical information exchange as well as a stimulating environment for mutual communication and experience sharing among the participants. The symposium will provide an international forum for the lead and zinc processing industries to exchange information about current processing technologies for primary and secondary lead and zinc, as well as about emerging technologies for both metals. The symposium scope includes process fundamentals, operational practices, and environmental issues. The applications of Pb&Zn in e.g. galvanizing and Pb-acid batteries, are also included.

The conference's technical programme comprises presentation sessions with two outstanding keynote speakers, a futurist and a managing director of a mining company.

A short course, in addition, will be hosted to enrich the conference and to benefit the participants. On Saturday 23 February the short course, entitled 'Control of surface structure and chemistry in lead and zinc processing', will be presented by two internationally known experts. The short course is designed for both newcomers as well as the experienced, to broaden and enhance their technical background.

Finally, we would like to express our sincere appreciation to the authors of invited and contributed papers and to all conference participants for their active participation. We also wish to express our heartfelt thanks to the committee members and short course lecturers for their tremendous efforts and substantial contributions to the conference. We are very grateful to all those who have worked hard in preparing the conference and the proceedings and making the conference successful.

W. van der Merwe
Chairman
Organising Committee



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Organising Committee

W. van der Merwe (Chairman)
P. Fouche T. Vermaak
R.T. Jones J. Wyethe
J. van Huyssteen

Conference Secretariat

Conference Co-ordinator, Julie Dixon
The Southern African Institute of Mining and Metallurgy
P O Box 61127, Marshalltown, 2107, South Africa
Tel: +27 11 834 1273/7 · Fax: +27 11 838 5923 or 833 8156
E-mail: julie@saimm.co.za

Key dates

Pre-conference workshop 23 February 2008
Conference dates 25–29 February 2008
Post-conference tour 3 March 2008

Registration

Conference registration fees includes conference attendance. Cabin registration fees include the cruise aboard *The Melody* cruiseliner, all meals and entertainment at the conference, and the opening cocktail party to be held on the night before boarding the cruiseliner.

Workshop registration fees

Members R2 300
Non-members R2 650

Registration fees

SAIMM members or presenting authors R6 400
Non-members R7 200
Students/retired members R1 800



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Cabin fees

All fees include port charges, insurance and staff gratuities, meals and entertainment.

Single delegate non-sharing	R7 738 per delegate
Single delegate sharing with an accompanying person	R5 338 per delegate (this covers the delegates costs, accompanying person's fees must still be included)
Two delegates sharing	R5 338 per delegate
Three delegates sharing	*R4 238 per delegate
Four delegates sharing	*R3 838 per delegate

Accompanying persons (delegates' partner and/or families)

- *R5 438 for one accompanying person sharing with a delegate
- *R4 338 for a second accompanying person sharing with one delegate and first accompanying person
- *R3 938 for a third accompanying person sharing with one delegate and two accompanying persons

Registration closes on the 15th of February 2008. All prices include 14% VAT. Tax invoices will be issued to all delegates.

Please note that all conference fees must be paid in full prior to the start of the conference. No delegates with outstanding registration fees will be allowed to board the ship.

Not included in registration fees—transport to/from the port, drinks, shore excursions and any items of a personal nature.

Cancellation

No refunds will be made for cancellations on or after 15 January 2008.

Exchange rate

The current exchange rate as at January 2008 is approximately US\$1.00 = R7.45 and GBP1.00 = R14.82.



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Workshop venue

Registration will begin at 08:00 on Saturday 23rd February. The workshop entitled 'Control of surface structure and chemistry in Lead & Zinc processing' presented by Roger Smart and Andrea Gerson from the *University of South Australia*, will be held at The Hilton, 12–14 Walnut Road, Durban. The workshop will begin at 09:00 and conclude at 15:00. Refreshments and a light lunch will be provided.

Conference venue

The conference will encompass a four nights' cruise aboard the luxury cruiseliner, *MSC Melody*, which will be leaving Durban harbour on Monday morning with a brief stopover at Bazaruto Island on Wednesday and returning to Durban harbour on Friday. The cruise ship



offers delegates a unique venue for their conference, with all amenities and accommodation already on board. Sprawling outdoor deck space surrounds the two swimming pools.

There's nothing to match the night-time fun aboard the *MSC Melody*, which sparkles with disco, cabaret, casino, dining, dancing and much much more!

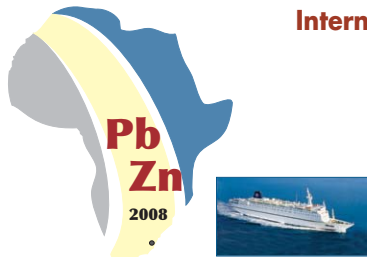
Special theme evenings are held every night of the cruise. You'll be

treated to cabaret shows featuring comedians, dancers, singers and speciality artists.

A detailed programme for the day's activities, designed to keep passengers informed about events and entertainment offered by the Starlight staff, will be delivered to the cabins every evening

Conference programme

The technical programme consists of keynote addresses by Dr Piet Muller, Futurist and Social Commentator and Mr Siphon Nkosi, CEO, Exxaro Resources, as well as the following papers and presentations:



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DAY 1 – Tuesday 26 February 2008

09:00–09:15 **Opening/Welcome Address**
W. van der Merwe, *Conference Chairman*

SESSION 1: MINERALS PROCESSING

09:15–09:55 **Keynote Address:**
P. Muller, *Futurist and Social Commentator, South Africa*

09:55–10:15 **Increasing capacity and productivity in the metals markets through pneumatic conveying and process injection technologies**
M. Coleman and G. Money, *Clyde Materials Handling Ltd, UK*

10:15–10:35 **Surface chemistry controlling galena flotation (PRESENTATION ONLY)**
R. Smart, *University of South Australia, Australia*

10:35–10:55 **Sponsor's Presentation**

10:55–11:20 **Tea Break**

SESSION 2: MINERALS PROCESSING (Continued)

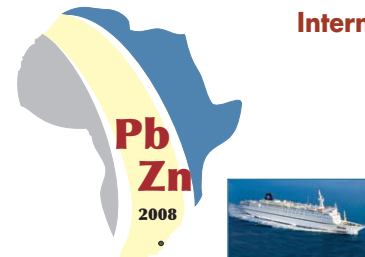
11:20–11:40 **Surface chemistry controlling sphalerite flotation (PRESENTATION ONLY)**
R. Smart, *University of South Australia, Australia*

11:40–12:00 **Comparison of copper activation mechanisms for sphalerite, pyrite and galena (PRESENTATION ONLY)**
A. Gerson, *University of South Australia, Australia*

12:00–12:15 **Thermodynamic and experimental aspects of thallium extraction from liquid lead**
P.M. Kapias and M. Pazdziorek, *The Silesian University of Technology, Poland*

12:15–12:30 **Sponsor's Presentation**

12:30–13:40 **Lunch**



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SESSION 3: HYDROMETALLURGY

13:40–14:05 **The development and implementation of industrial hydrometallurgical gallium and germanium recovery**
T.S. Fayram and C.G. Anderson, *University of Montana, USA*

14:05–14:30 **Recent recovery improvement initiatives at Zincor: the use of zinc oxide fume and low-ferrite calcine for iron removal to reduce un-dissolved zinc losses**
J.P. Wyethe, N.M. Vegter, *Exxaro South Africa* and J.M.S. Rodrigues, *Zincor South Africa*

14:30–14:40 **Sponsor's Presentation**

14:40–15:05 **Tea Break**

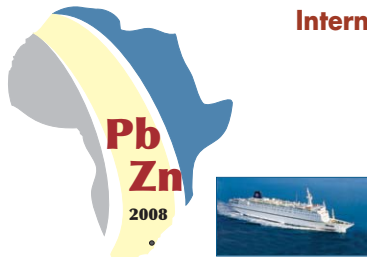
SESSION 4: HYDROMETALLURGY (Continued)

15:05–15:30 **Outotec direct leaching application in China**
T. Haakana, B. Saxén, L. Lehtinen, H. Takala, *Outotec Research Oy, Finland*, M. Lahtinen, K. Svens, M. Ruonala, *Outotec Oyj, Base Metals, Finland*, and X. Gongming, *Zhuzhou Smelter Group Co. Ltd, P.R. China*

15:30–15:55 **From C.Z.O. to zinc cathode without any pre-treatment – The EZINEX process**
M. Olper and M. Maccagni, *Engitec Technologies, S.p.A. Italy*

15:55–16:20 **Local process investigations on composite electrodes: On the way to understanding design criteria for spray coated anodes in Zn electrowinning**
S. Schmachtel, M. Toiminen, K. Kontturi, O. Forsén, *Helsinki University of Technology, Finland*, S.E. Pust, G. Wittstock, *Carl von Ossietzky University Oldenburg, Germany*, and M.H. Barker, *Outotec Research Centre, Finland*

16:20–16:45 **The alkaline sulfide hydrometallurgical separation, recovery and fixation of tin, arsenic, antimony, mercury and gold**
C.G. Anderson and L.G. Twidwell, *University of Montana, USA*



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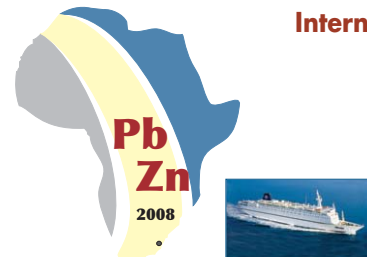
DAY 2—Thursday 28 February 2008

SESSION 5: PYROMETALLURGY

- 09:00–09:45 **Keynote Address:**
S. Nkosi, *Exxaro Resources Limited, South Africa*
- 09:45–10:10 **Gaseous reduction of ISASMELT lead slag and lead blast furnace sinters**
B. Zhao, E. Jak, and P. Hayes, *The University of Queensland, Australia* and
B. Errington, *Xstrata Technology, Australia*
- 10:10–10:35 **Ausmelt technology for lead and zinc processing**
S. Hughes, M.A. Reuter, R. Baxter, and A. Kaye, *Ausmelt Limited, Australia*
- 10:35–10:50 **Tea Break**

SESSION 6: PYROMETALLURGY (Continued)

- 10:50–11:15 **Developments in Zinc concentrate roasting (PRESENTATION ONLY)**
M. Tacke, *Outotec (Pty) Ltd, South Africa*
- 11:15–11:40 **Increased productivity of zinc roasters and SO₂-quality**
P. Taskinen, M.-L. Metsäranta, B. Saxen, *Outotec Research Oy, Finland*,
S. Penttinen, *Boliden Kokkola Oy, Finland*, K. Svens, *Outotec Oyj, Finland*, and
B. Kerstiens, *Outotec GmbH, Germany*
- 11:40–12:05 **Efficiency and productivity increase of lead and zinc pyrometallurgical processes through on-line control and optimization (PRESENTATION ONLY)**
F. Kongoli, I. McBow, and S. Llubani, *Flogen Technologies Inc., Canada*,
E.Z. O'Brien, *Flogen Technologies Inc., USA*
- 12:05–12:30 **The oxipot—A new pyrometallurgical bullion lead refining process (PRESENTATION ONLY)**
M. Potesser, *Messer Austria GmbH, and University of Leoben, Austria*,
B. Holleis, *Messer Austria GmbH, Austria*, M. Adendorff, *Messer Group GmbH, Germany*,
H. Antrekowitsch, and S. Konetschnik, *University of Leoben, Austria*
- 12:30–13:15 **Lunch**



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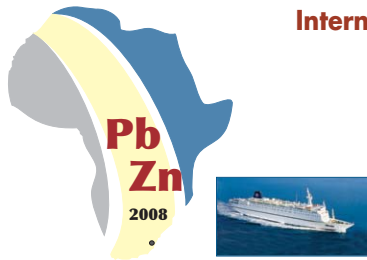
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SESSION 7: PROJECTS AND PROCESS IMPROVEMENT

- 13:15–13:40 **Development of a viable process for the recovery of zinc from oxide ores**
J.R. de Wet and J.D. Singleton, *Green Team International (Pty) Ltd, South Africa*
- 13:40–14:05 **Balancing profits in paradise by exploiting a zinc-lead mine at highest elevation on the earth through energy efficient process aimed at sustainable development of the mountainous areas of Rasuwa and Dhading districts, Nepal**
M.L. Baharani, *Mecon, India* and C.K. Chakrabarti, *Nepal Metal Company Limited, Nepal*
- 14:05–14:30 **Evaluation of pre-beneficiation options for upgrading of low grade ore from Rosh Pinah Zinc-lead mine**
D. Reddy and N.M. Vegter, *Exxaro Resources Limited, South Africa*
- 14:30–14:55 **Tea break**

SESSION 8: PROJECTS AND PROCESS IMPROVEMENT (Continued)

- 14:55–15:20 **Piloting of the Ishigaki Fibre-Wakishimizu (fibre media rapid filtration equipment) at Skorpion Zinc**
H.F. Fuls and K. Nong, *Namzinc (Pty) Ltd, Namibia*
- 15:20–15:45 **Pb battery recycling—New frontiers in paste desulphurisation and lead production**
M. Olper and M. Maccagni, *Engitec Technologies S.p.A., Italy*
- 15:45–16:10 **Zinc recovery from wastes using spent acid from scrapped lead acid batteries**
Z. Kunicky, J. Dostal, *Kovohute Pribram nastupnicka, Czech Republic*,
J. Jandova, and P. Dvorak, *Prague Institute of Chemical Technology, Czech Republic*
- 16:10–16:35 **Value driven resource allocation and focus in the early stages of project development**
M.J. van der Merwe, N.M. Vegter, and N. Momberg, *Exxaro Resources Limited, South Africa*



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Social functions

Registration

Registration will take place on Sunday the 24th of February at the Hilton Hotel in Durban from 17:00. This will be followed by a cocktail party. Those delegates unable to register on Sunday the 24th can register on Monday the 25th from 09:30 to 11:00 at the harbour prior to boarding. Please note that delegates will not be allowed to board without first registering with the SAIMM for the conference.

Delegates must attend registration in order to obtain their copy of the conference proceedings and the necessary documents to board the ship.

Monday 25 February 2008

All delegates will board the ship between 12:00 and 14:00 and there will be a casual social event in the evening.

Tuesday 26 February 2008

Conference presentations will begin and continue throughout the day. In the evening there will be a formal social event.

Wednesday 27 February 2008

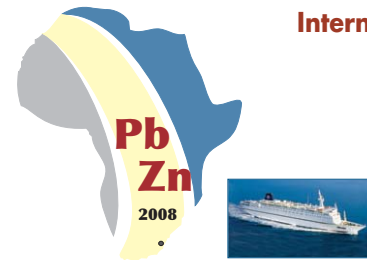
All delegates will have an opportunity to disembark and tour Bazaruto Island. There will be a deck party aboard the ship in the evening.

Bazaruto Island

Bazaruto Island is the largest of the four islands that make up the Bazaruto Archipelago. The islands form the backbone of a huge national marine reserve that boasts not only over 180 species of birds, but nearly 80% of all fish species in the Western Indian Ocean. Sightings of dolphins, turtles, and flocks of thousands of flamingos are common.

Landings are totally dependent on sea and weather conditions at the time. The Captain is the sole judge of whether it is safe to go ashore.

There will be a variety of activities available to delegates. All costs for the island activities will be at the delegates' expense.



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Thursday 28 February 2008

The second day of conference presentations will resume. This will be followed by a casual social event.

Friday 29 February 2008

All delegates will disembark the ship between 10:00 and 11:00.

Technical tours

Due to a lack of registrations, the Namibian leg of the technical tours had to be cancelled. The tour to Zincor and Fry's Metals will continue on Monday 3 March, at no additional cost. Delegates interested in attending this tour should contact the conference co-ordinator directly.

General information

Airport shuttle

A shuttle service is available from Durban International airport direct to Durban Port and visa versa at a cost of R55 per person each way. The shuttle meets all flights on cruise departure days only. The shuttle service runs a continuous service to the airport and back on the days the ship leaves and returns i.e. Monday 25th and Friday 29th of February.

Banking / credit cards / foreign exchange

In all major centres in South Africa, there are banking institutions that are affiliated with international banks. Major credit cards are generally accepted throughout South Africa.

American Express Tel: +27 11 359 0200,

Diners Club Tel: +27 11 358 8400,

Master Card and Visa Tel: Tel +27 11 498 4699.

The following banks offer foreign exchange services: ABSA, First National, Nedbank and Standard Bank. Automatic teller machines (ATMs) are found in every city and in most towns. Several international banks have branches in the main cities. Most commercial banks are open from 09:00 to 15:30 on weekdays and 08:30 to 11:00 on Saturdays.



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Car rentals

Avis Rent a Car—Central Reservations

Tel (Intl): +27 11 923 3500, Fax (Intl): +27 11 923 3683, Toll-free: 08 000 21111

Budget Rent a Car—Central Reservations

Tel (Intl): +27 11 392 3929, Fax (Intl): +27 11 392 3900, Toll-free: 08 600 16622

Europcar Interrent—Central Reservations

Tel (Intl): +27 11 396 9000, Fax (Intl): +27 11 396 1406, Toll-free: 08 000 11344

Imperial Car Rental—Central Reservations

Tel (Intl): +27 11 453 0005, Fax (Intl): +27 11 453 6278, Toll-free: 08 610 13100

Credit card for on-board expenses

Life on board the Melody is like living in a ‘cashless society’. The only items that can—and **must**—be paid in cash (US dollars), are the baby sitting services and the casino.

In keeping with the generally adopted practice of most major cruise lines, each delegate will be given a ‘Cruise Card’ at the time of check-in. This card acts as an ID for getting on and off the vessel, and is also used when making purchases on board.

Once on board, delegates will need to activate their cards. To do so, they should visit the Cruise Card office on board and either leave cash or a credit card deposit, which will be offset against on-board expenses.

It is important to note that debit cards are not accepted on board.

If you elect to activate your Cruise Card by means of a credit card, it is VERY IMPORTANT to note the following:

Again, in keeping with general practice adopted internationally, the delegates credit card will be ‘swiped’ and pre-authorised for the amount of approximately USD\$ 250.00. This pre-authorisation is only an estimate of the amount that could be utilised during one’s time on board. This pre-authorisation is not a real debit and the amount is ‘blocked’ on the credit card for the period of one week. After the one-week period has lapsed, the bank automatically releases the pre-authorised amount. The only amount debited to the credit card will be the amount that corresponds with the invoice confirmed and signed by the delegate prior to disembarkation.

Should delegates chose to activate their Cruise Card by credit card, two copies of their bill will be placed in their cabin on the last night of the cruise. If they are satisfied with the charges reflected, they should sign one copy of their bill and leave it at the reception desk before disembarking. (Should a delegate have any on-board account queries, please approach the Cruise Card office before arriving in port.)



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Excursion

The excursion planned for Wednesday 28 February to Bazaruta Island during the cruise is optional and for the expense of the delegate and his/her accompanying person/s. All excursions must be booked on board and within the time stipulated in the daily programme.

Shore excursion

Bazaruto:

*Price US\$ per person

Beginners snorkel permit (delegates to take their own gear)	5
Coral gardens (gear not included)	10
Survival walk	5
Scuba diving	50
Power snorkel	20
Kayaking	15

***Please note prices are subject to change.**

Hotels

Contact details for hotels near the harbour (Delegates to arrange privately).

The Edward, Durban (part of the Protea chain) 0031 337 3681—res3@proteaedwards.co.za

Southern Sun South Beach 0031 337 2231—gcsouthbeach@southern.sun.com

The Protea Hotel Garden Court 0031 337 3341—gcmarineparade@southern.sun.com.

Parking—Durban harbour

Secure undercover parking is available in the shed adjacent to the passenger terminal at a cost of R60 per night. Additional parking is available at many of the parking garages near the harbour.

Shore landings

The Mozambique destinations do not have harbour facilities, therefore the ship anchors offshore and passengers are ferried ashore by means of Zodiacs.

Please ensure that valuables such as cameras are protected as the ride can be quite wet and bumpy!

Standard time

Also known as Central African Time (CAT). There is no daylight saving in South Africa. Sunrise in February is 05:30 local time and sunset is at 19:00

CAT = GMT + 2 hours, or CET + 1 hour, or EST +7 hours.



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Visas and passports

International delegates require a re-entry visa as the ship sails outside of South African waters. All South African delegates require a valid South African passport.

Waiver of liability

The conference organisers have taken reasonable care in making the arrangements for the conference, including technical visits. The organisers do not accept liability for any loss or injury sustained, or for unforeseen changes to the programme. The organising committee reserves the right to cancel any tour or visit due to insufficient interest.

DIRECTIONS TO DURBAN HARBOUR

From Pietermaritzburg (Johannesburg to Harbour):

Take the N3 to Durban, you will come to a fork in the road—take city (not beach).

When you come to the first set of robots, turn right into Grey Street.

Cross over West and Smith Street (Grey Street becomes Broad Street).

When you come to the end (T-junction), turn left into Victoria Embankment (Esplanade).

Follow this road until you get to the sixth set of robots (to your left should be Stanger Street and to your right should be Quayside Road).

Turn right into Quayside Road—go through security (boom gates), follow signposts to the **N-Shed**.

From the North Coast:

Take the Northern Freeway M4 (Freeway which runs along the beach).

You will come to a set of robots that go over Argyle Road, carry on straight. Go past Durban Drive Inn, C R Swart Police Station; Cross over Somtseu, Old Fort Road, Ordane, Pine Street, West, Smith Street.

The next set of robots after Smith Street turn right into Victoria Embankment (Esplanade).

At the first set of robots turn left into Quayside Road—go through security (boom gates), follow signposts to the **N-Shed**.

From the South Coast:

Following the M4 Freeway, take the Victoria Embankment (Esplanade) off ramp.

Follow the Embankment till you get to a set of robots where Stanger Street is on your left and Quayside on your right.

Turn right into Quayside—go through security (boom gates), follow signposts to the **N-Shed**.

There is secure undercover car parking available for up to 72 cars at R60.00 per vehicle per day. This parking is within 30 m of the **Embarkation terminal (N-shed)** and has a 24 hour security guards and camera surveillance.