Coaltech Newsletter 2024

The Coaltech Research Association NPC

Colloquium on 31 May 2024 — Attendance is FREE

Click below to view our agenda

Our Exhibitors

AECI | AGRENCO | BIRD MACHINES TRACKLESS MINING EQUIPMENT | FABCHEM MINING | Jones & Wagener Engineering & Environmental Consultants | BOOYCO ELECTRONICS | MANDELA MINING PRECINCT MINDS FOR MINES | SITECH | BCOM INNOVATIVE CONSULTING | Kuphela Environmental Sustainable solutions

Key speakers

Layton Nenzinane - Seriti Green: (CFO)

ENVIRONMENT

Marthinus Wessel van Wyk, Thungela
Prof Wayne Truter, Enterprises University of Pretoria
Maria Heyneke, Jones & Wagner
Anthin Botes, GreenGab

Mining

Gavin Silver, Seriti
Gerhard Stenzel, Glencore
Adriaan Oosthuizen, Jones & Wagner
Michael van Schoor, CSIR
Inus Labuschagne, Sasol Mining

Processing

Maynard Lombard, Thungela
Jovani van Brakel, North-West University
Prof Samson Bada, Wits University
Prof Marco le Roux, North-West University

Join us at the Colloquium on 31 May 2024
Click here to register

Message from Henk - CEO

Dear Reader,

In our first newsletter of the year, we discuss some of changes and developments affecting Coaltech. As the saying goes, "nothing is certain, except change" and this is also true for Coaltech, with some people leaving, new ones taking their place, and some projects finished and new projects initiated. The coal mining industry finds itself squeezed between the conflicting imperatives of decarbonising the energy and industrial landscape and the need for a just energy transition. Coal research and development (R&D) is a crucial component of the transition towards a sustainable energy future and Coaltech has an important role to play in this process. I want to thank Eskom and the coal mining industry for their support of our R&D. The industry's investment in this R&D is essential for coal mining to remain a safe, productive, and environmentally responsible industry.

Who's new

Maynard Lombard - New Coal Processing chairperson

Coaltech says goodbye and best wishes to Dr S Mangena who has accepted a new position with the CSIR. Maynard Lombard will be the new Processing SteerCom Chair as of 1 March 2024.

Maynard graduated from the University of Cape Town with a degree in Chemical Engineering in 2002. He joined Anglo American at Bank Colliery where he was enrolled in the Anglo American Metallurgical Graduate Training Programme. He was transferred to Landau Colliery in 2003 as Senior Plant Metallurgist and in 2005, Maynard was transferred to Greenside Colliery as Plant Superintendent. In 2008, Maynard was transferred to Landau Colliery as Plant Manager and in 2011 was transferred to Greenside Colliery as Metallurgical Manager. In 2016 he was transferred to Khwezela Colliery as Metallurgical Manager. He is currently the Processing Manager for Thungela Resources. Maynard has completed various capital projects at the different operations such as installation of Teeter Bed Separators, Flotation and Filtration Plants and Three Product Cyclones.

Maynard is currently involved in various industry committees including Coaltech Coal Processing sub-committee, Richards Bay Coal Terminal technical sub-committee and South African Coal Processing Society.

Marthinus Wessel van Wyk - New Environment chairperson

Coaltech says goodbye and best wishes to Ritva Muhlbauer who retired at the end of 2023. Marthinus Wessel van Wyk will be the new Environment SteerCom Chair as of 1 January 2024.

Marthinus has a background in unconventional oil and gas within sub-Sahara Africa as part of a structural geological team. Joining Thungela in 2018 he advanced sustainable and environmentally-conscious practices within the mining industry, implementing several Coaltech research projects.

A key interest is within his research is a holistic approach to environmental management and rehabilitation optimisation along with a keen focus on (ESG) reporting.

Marthinus currently holds a MPhil in Environmental Management from the University of Cape Town.

Congratulations

Natasia Naudé appointed Head of the Department of Materials Science and Metallurgical Engineering, UP

Natasia Naudé is extensively involved in the Coal Industry, having undertaken several research projects for the sector at the University of Pretoria (UP). Currently, she actively facilitates two short courses, namely Basic Coal Preparation and Advanced Course in Coal Preparation, offered through Enterprises (UP) to Exxaro Grootegeluk. Over the past 14 years, Natasia has been engaged with Coaltech and has supervised numerous Master's degree research projects sponsored by the organisation. Some notable projects she has overseen include:

- Discrete element modeling to predict the behavior of coal particles during flow.
- Evaluation of ilmenite as a possible medium in a dry dense medium fluidised bed.
- The recovery of magnetite after dry dense medium fluidised separation.
- Upgrading of coal fines with Continuous Variable Discharge (CVD) Knelson Concentrator (project currently being completed).

RESEARCH PROTECTS FOR THE FIRST QUARTER OF 2024

Environment

Biological treatment of brine wastes: Water treatment, waste/brine management

By Mintek

Mintek has developed a biological process (cloSURE®) for treatment of acid mine drainage, suitable for treating mine water with elevated concentrations of sulphate (3 – 4 g/L). The process consists of two stages, namely a biological sulphate reduction (BSR) step followed by an oxidation step for sulphur recovery.

The aim of this project is to apply Mintek's biological treatment process for the treatment of brine waste, with the focus on the removal of sulphate salts. The objectives of such a process is to recover value products, as carbonate or bicarbonate compounds, and to reduce the volume in brine ponds. One of the major environmental problems faced by the mining industry is brine produced from reverse osmosis treatment of mine impacted waters. Currently these brine are reduced in volume by evaporation in brine ponds, or further concentration by reverse osmosis treatment to reduce the volume in the brine pond. These methods offer a short term solution due to the numerous challenges associated with the limited storage capacity of brine dams and the complexities involved in treating hyper saline brine.

The sulphur cycle is an active element in natural hypersaline environments, such as salt lakes and salt marshes, and a few studies have investigated the sulphate reducing bacteria that are present. However, little is known about the activity of these microbes or the mechanisms of sulphate reduction under hypersaline conditions. There is even less known about their application in treatment of hypersaline waters.

Read the full article here

Land use potential of growing natrophile grass species to regenerate rehabilitated land by irrigating them with sodium rich mine impacted water

By Enterprises, University of Pretoria

Irrigating vegetation with mine water that is rich in specific minerals can have both positive and negative effects on plant growth and soil quality. Selecting the correct species that can tolerate high levels of such minerals can offer an opportunity to potentially extract the mineral from the soil that gets deposited by the irrigation water. From a positive perspective, mine water can provide a source of water for vegetation to increase its productivity and indirectly minimise a potential negative impact on the soil and subsequently the environment.

Additionally, minerals present in mine water, can provide essential nutrients for plant growth. It is always essential to quantify the negative effects of such high levels of minerals present in irrigation water, for example sodium (Na), which is present in the irrigation water to be researched at Thungela's Isibonelo Mine. Sodium can cause soil salinization if accumulated in high levels in the soil, which can be detrimental to plant growth. Waters rich in sulphates in the form of calcium sulphate can also affect soil structure and reduce water infiltration, which can lead to waterlogging and poor drainage. Additionally, mine water may contain other contaminants, such as heavy metals or acids, which can be toxic to plants and need to be quantified.

Read the full article here

Processing

Repurposing of coal waste: Incorporation of coal waste in asphalt mixes

By CSIR

The study aim is to investigate the potential to repurpose coal waste for continuously graded asphalt wearing course mix in the construction industry.

South Africa has substantial coal reserves which are envisaged to last for the next 200 years and it is amongst the leading coal producers in the world. On average, South Africa produces about 224 million tonnes of marketable coal annually, ranking the country fifth among coal-producing countries globally. Regarding global ranking in coal reserves and consumptions, South Africa is ranked eighth and seventh respectively. In South Africa, coal is the traditional and dominant energy source, accounting for about 70% of the country's primary energy needs. Other uses of coal are in steel production, cement, paper, and aluminium industries. Approximately 25% of the total coal produced is exported, ranking South Africa the third among coal-exporting countries in the world. The remaining produced coal supplies a variety of local industries like electricity generation (53%), petrochemical industries (Sasol, 33%), metallurgical industries (12%), and domestic cooking and heating (2%). Coal mining continues to play a vital role in South Africa's economy, with significant contributions through sales and employment. In 2022, the coal industry employed about 90 977 people, and generated a total of R252.3bn in sales from the 231.2 million tonnes produced in the year.

Read the full article here

Recycling coal waste to building components: Demonstrating technical feasibility, environmental friendliness, and lifecycle assessment

By Wits University

This proposed bench-scale project aims to produce technical-size coal composites for building applications prepared from different Coaltech members coal waste and preceramic polymer.

With growing global demand for reliable, low-cost energy, coal remains the world largest source of energy, despite the uncertainties surrounding coal as a source of energy. Coal is the main source of energy and carbon feedstock of our chemical, cement, and ferroalloy industries in SA. However, mechanised mining and the beneficiation of run-of-mine (ROM) coal to produce clean coal for power, chemicals, and metallurgical applications generates coal waste. Therefore, constituting a risk to sustainability. In South Africa, about 60 million tonnes of coal waste are produced yearly with more than 1.5 billion tonnes already accumulated. Unfortunately, only a proportion of this coal waste is converted into high-value, high-performance products. The remainder is traditionally disposed of in landfills and piled up in arable land, resulting in unintended health, safety, and environmental impacts.

Read the full article here

Mining

Guideline for best practice for respirable dust sample processes. Extend on the recommendations and findings of Project M2020.4

By Latona

The research study aims to further the findings and recommendations of ProjectM2020.4 by developing these into a Coaltech guideline for best practices for the sampling of respirable dust processes. The best industry practice is expected to be derived from, but not necessarily limited to, the findings and recommendations of the M2020.4 report by observing and recording best practices across the industry.

This will assist mines to optimise the procedures and processes, identify areas for improvement, and improve the overall reliability of respirable dust samples. Project M2020.4 identified that only 64% to 67% of respirable dust samples taken can be considered reliable. Along with this it identified the main causes of the low reliability of samples, including problems associated with issuing and receiving dust samplers, with wearing samplers, and with understanding the reasons for sampling.

Read the full article here

Life-sustainability of refuge bays in underground collieries: 48-hour practical test with volunteers.

By Latona

The practical assessment of the life sustainability of refuge bays requires that a real emergency scenario be conducted under controlled observations and conditions. This exercise requires that a team of people stay inside of an identified refuge bay to ensure that the recommendations from the original project (Coaltech Project no. M2022-2: Assessing the life-sustainability of underground Refuge Bays in South African collieries) to keep people alive inside a refuge bay, is practical and as complete as possible to pass any reasonable man test under extreme escape and rescue procedures.

Extract from Project M2022-2 report Recommendation: To ensure the maximum life-saving potential of any refuge bay in an underground mine, various suggestions / recommendations must be considered.

These recommendations include but is not limited to the following:

A long-term test with real occupants (volunteers) to be conducted over at least a 48-hour period to determine the morale, real-life reactions and conduct of survivors in an emergency situation. This test should include the provision of water, food, clothing, medication, first aid equipment and communication to surface control room. This communication should/could, if possible, include a visual component to reassure the occupants. The management of toilet waste should be monitored to ensure a healthy environment.

Read the full article here

PHYSICAL ADDRESS
Mandela Mining Pecinct, Cnr Carlow and Rustenburg Roads, Melville
HENK LODEWIJKS - CEO
Tel: 011 358-0014
E-Mail: hlodewijks@coaltech.co.za
CARMEN BERGMAN-ALLY
Tel: 011 358-0011
E-Mail: cbergman@coaltech.co.za
WWW.COALTECH.CO.ZA
FOLLOW US ON: