MANDELA MINING PRECINCT
MINDS FOR MINES

MINING MINDS

Eighth Edition
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Dear MMP Stakeholders

I love this time of year, when the trees are budding bright green, and despite the lack of rain, bulbs are literally springing up from the baked hard ground. It shows that a lot goes on even when it's not visible.

Research is a bit like this – a lot of background work that goes into discovering new things, new ways, and new processes. A lot has been happening in the MMP Team and within our broader collaboration network over the past six months. As the MMP, our research programme is underway for the financial year, and most of the contents in this newsletter share these stories. At the same time, we are delighted that the University of Pretoria celebrated the first graduating students from their SAMERDI Research Centre, with the two postdoctoral students at the University of the Witwatersrand finalising their contracts with their respective SAMERDI Research Centres. Capacity development is a critical part of the SAMERDI strategy, which the MMP facilitates and coordinates, including via these university centres.

Our SATCAP programme contributes significantly to capacity development and empowerment and has successfully run a youth immersion study tour and women empowerment webinar recently. The MMP Programme interns also get exposure to the industry, and for some, their first experiences working underground. We are proud to be able to support people in their careers beyond their initial degrees, giving them a head start into the world of work. We ensure that their development includes not only technical work, but also mentoring for interpersonal skills, elements such as report-writing, and public speaking: all skills that contribute to job satisfaction and advancement.

An exciting opportunity was presented to our one Programme Manager Mr Jurgens Visser, who visited the "Mining Transformed" exhibition & BEV conference at the underground training facility Norcat in Canada, in May 2024. This was a time to witness leading edge technologies at work in a real underground setting, while networking, and discovering the modernisation

journey of mining houses, technology developers, and original equipment manufacturers (OEMs). We have an equally exciting announcement for 18 November 2024: the MMP Showcase Day at the International Convention Centre, CSIR, in Tshwane. The event provides a space where we share stories of our research journeys, with collaborators and contributors, and get to showcase emerging technologies for the future of mining. Attendance is free, but you must register. After so much time spent in Teams and Zoom meetings over the past few years, please do come and meet the faces and people behind the voices: we'd love to see you. Come and have an experience, not just a meeting!

We welcome all feedback from you about our work: better informed decisions are usually better decisions, and we are in this together. Please do call, pop an email through or catch us on any of the social media platforms. Until then, take care.

Julie Courtnage
Executive Director

Visit to NORCAT Underground Centre

MMP Programme Manager for the Test Mine, *Jurgens Visser, attended the Mining Transformed 2024* tech exhibition in Sudbury, Canada from 27 – 29 May 2024.

This unique event, the world's only technology exhibition held in an underground operating mine, took place at the NORCAT Underground Centre. This centre is built around the former Fecunis Adit Mine, a working underground operation that was formerly owned by Falconbridge (now Glencore). Over two dynamic days, technology firms unveiled groundbreaking innovations set to reshape the global mining landscape. These innovations were showcased and demonstrated live, both underground and on the surface, captivating an international audience of mining professionals.

The event attracted technology developers, mining executives, and other key stakeholders, facilitating a rich exchange of ideas and potential partnerships. "The event provided a valuable opportunity for me to connect with a diverse group of industry leaders capable of advancing new technologies. I gained valuable insights into areas such as tele-remote operations, autonomous vehicles, advanced telemetry, and sensor systems," Visser shared.

BEV in-Depth: Mines to Mobility conference

While in Canada, Visser also had the opportunity to attend the "BEV In-Depth: Mines to Mobility" conference, held on May 29-30, 2024, at Cambrian College in Sudbury. The conference focused on the battery electric vehicle supply chain, aiming to bridge the gaps between the mining and automotive industries. It explored the interconnections between mineral processing, automotive manufacturing, and advancements in battery and green energy technologies.

The conference featured sessions and panels with experts from various sectors and provided opportunities for attendees to test drive battery electric vehicles. "This convergence of industries underscores both the potential and the challenges in advancing the battery-electric economy," says Visser.

MMP Showcase Day

The Mandela Mining Precinct invites you to an exciting showcase that will highlight innovative mining modernisation tools and solutions, people-centred approaches to technological change and human capital development programmes.

This event will also feature a demonstration of local and global innovative technologies used to create "glass-rock" environments for mining development and technology adoption in the South African mining sector.

As a valued stakeholder, your presence would greatly enrich this inspiring and knowledge sharing event.

Date: Monday, 18 November 2024
Time: A full day of inspiration, from 8am to 5pm
Venue: CSIR ICC, Pretoria

Register here

Exploring non-explosive rock-breaking methods for the SAMI

The Mandela Mining Precinct, in collaboration with the CSIR, is spearheading a groundbreaking study to explore alternative rock-breaking methods that could revolutionise the South African mining industry by moving away from explosives-based techniques.

Drilling and blasting with explosives have long been the standard in rock-breaking for underground construction projects such as tunnels and caverns. However, this approach presents significant safety and environmental challenges, including the production of toxic fumes, ground vibrations, and dust.

"Shifting to explosives-free methods could significantly improve safety, and operational efficiency by allowing continuous operations, thereby eliminating the downtime typically required for additional ventilation to clear blast fumes, says MMP Mechanised Mining Systems Programme Manager, Martin Pretorius.

Read more here

A Mining Technology Commercialisation Framework

The Mandela Mining Precinct, in collaboration with RiiS, has successfully completed phase 1 of the Technology Business Improvement commercialisation framework, designed to accelerate the commercialisation of mining technologies.

This three-phased project began with a comprehensive study outlining the product development process for mining technologies, particularly focusing on advancing from Technology Readiness Level (TRL) 6 to TRL 9. In phase 2, the focus will shift to developing a robust commercialisation framework by establishing essential components and tools that enable systematic technology maturation. These tools will undergo verification and refinement with key stakeholders to ensure they are fit for purpose at each stage of product development. Phase 3 will involve the creation of a dedicated information-sharing platform that also offers administrative support, enabling stakeholders to address common challenges associated with product development agreements.

Read more here

Value Creation Through Advanced Orebody Knowledge Research and Innovation – GSSA Bushveld Branch Talk

MMP Advanced Orebody Knowledge (AOK) Programme Manager, Michelle Pienaar, delivered an insightful presentation on *Value Creation Through Advanced Orebody Knowledge Research and Innovation* during the Bushveld Branch GSSA talk at Impala Bafokeng Exploration Core Yard in June this year.

The event attracted geologists from various mines in Rustenburg and surrounding areas, an excellent platform for the AOK programme to share its cutting-edge research and innovations with key industry professionals.

Pienaar's talk highlighted the AOK programme's vision to create a "glass rock" environment, where the orebody becomes virtually visible, allowing for safer, more efficient mining. The programme aims to detect geological hazards and other associated risks, providing real-time insights that prevent injuries, equipment damage, and costly disruptions. The ability to anticipate and adapt to geological changes can also significantly boost mining productivity.

Read more here

Empowering Future Leaders – SATCAP Careers Study Tour

The Mandela Mining Precinct Successful Application of Technologies Centred Around People (SATCAP) Programme, in collaboration with the Department of Mineral Resources and Energy, Wits Tshimologong Digital Innovation Precinct , and other SATCAP partners, hosted a careers study tour for KZN-based Nombuso High School learners.

The tour introduced delegates, including learners from KwaZulu Natal-based Nombuso High School and youth from the South African Mining Young Association to careers in mining, digital innovation, and entrepreneurship through presentations and interactive activities like a mining board game and virtual reality interaction.

The tour was geared towards exposing school learners and youth to information that will help them make informed career choices and connect them to the world of work.

Together, we're shaping future careers in mining and digital innovation!

Women Empowerment Webinar

On 22 August 2024, the MMP SATCAP Programme hosted a captivating half-day event empowering women in South Africa's #JustEnergyTransition (JET).

Industry leaders, researchers, and students gathered to explore women's pivotal role in driving climate justice and sustainable practices in mining. Through presentations, panels, and discussions, participants examined gender equity in the energy transition, addressing policy, skills development, and empowerment initiatives.

The event celebrated women leading sustainability efforts in mineral resources and featured a roundtable on gender equality in green energy, highlighting industrial symbiosis, job creation, and sustainable agriculture.

SATCAP remains dedicated to placing women at the forefront of South Africa's energy transition.

Discover How RTIMS is Revolutionising Mining Operations!

The MMPs Real-Time Information Systems Programme has been running a social media campaign, reflecting on how the programme's transformative solutions are reshaping the mining industry.

RTIMS, through its research partners and collaborators, has focused on hard rock, underground mining—tackling the high costs and technical barriers of last-mile connectivity. The campaign covers key topics, including RTIMS' role in enhancing safety and operational efficiency, the potential of real-time data in mining, and innovations like stope-face monitoring and data integration platforms driving the industry's future.

Follow the campaign here to stay updated

RESEARCH PAPER: Acoustic device for recording and tracking rock hazards on the mining face

The MMP AOK Programme recently presented a research paper at the Deep Mining Conference in Canada. The paper showcased an innovative acoustic device designed to record and track rock hazards at the mining face, offering a cutting-edge solution for improving safety in deep mining environments. This innovative system combines advanced acoustic analysis with ultra-wideband (UWB) location technology to detect and track rock hazards in real time at the mining face.

The location system is georeferenced to the mine's local coordinate system using available survey pegs. By integrating these technologies, each acoustic data point includes a spatial XYZ coordinate which facilitates tracking of loose rock locations throughout the mining excavation process.

This dual-sensory approach advances previous methods by leveraging the innovation of acoustic technology and tailoring algorithms to specific rock types, enhanced by the tracking function so that rock hazards encountered underground can be mapped and communicated to the operational team.

The paper can be accessed here:

science & innovation
Department:
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