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Report on the Noise Engineering Controls Convention – 13 June 2025

Hosted by: Minerals Council South Africa MOSH Noise Team

Programme Director: Kagisho Motseme

Venue: Emperors Palace, Johannesburg, South Africa

1 INTRODUCTION

The Noise Engineering Controls Convention was held with a primary focus of advancing strategies to mitigate Noise-Induced Hearing Loss (NIHL) within the South African Mining Industry (SAMI) by highlighting the latest advancements in Acoustic Engineering Controls in the Workplace, Predictive Modelling, and other innovative technologies shaping the future of noise risk management. The event was organized by the MOSH Noise Team of the Minerals Council South Africa, with Kagisho Motseme serving as the Programme Director.

The convention brought together more than 250 delegates and featured 13 expert speakers, each presenting on critical aspects of noise management and innovative engineering solutions aimed at reducing occupational noise exposure in mining environments.

In addition to the speaker sessions, the convention hosted a range of exhibitors specialising in noise risk management technologies and services. These exhibitions provided valuable opportunities for delegates to engage with solution providers and explore practical applications of the concepts discussed throughout the day.

The Noise Engineering Controls Convention was structured around three key themes: ***Setting the Scene***, ***Acoustic Engineering***, and ***Noise Prediction***. The themes guided the flow of presentations and discussions throughout the day, offering a comprehensive insight into the challenges and innovative solutions in noise risk management. The proceedings of the day are outlined below.

2 THEME 1 - SETTING THE SCENE

2.1 Keynote Address by Paul Dunne (CEO Northam Platinum and Noise Sponsor)

Mr Paul Dunne opened the Noise Engineering Controls Convention with a compelling keynote address, emphasizing the critical importance of addressing NIHL through engineering innovation, strategic leadership, and cross-sector collaboration. NIHL remains one of the most pervasive and persistent

occupational health hazards in SAMI. Citing research that shows up to 73% of mine workers may suffer some degree of hearing loss by the time they retire, Mr Dunne underlined the severity of the issue. He painted a vivid picture of the daily working conditions miners face—constant drilling, blasting, and exposure to outdated or poorly maintained machinery—all contributing to hazardous noise levels.

Mr Dunne reaffirmed the industry's commitment to the Mine Health and Safety Council (MHSC) milestones, which now aim to reduce operational noise levels to 104dB(A) by 2034, an evolution from the previous 107dB(A) target. More ambitiously, the industry has pledged to eliminate all new cases of NIHL among previously unexposed employees by 2034. To support this ambition, Mr Dunne introduced a comprehensive Noise Risk Reduction Strategy, developed in collaboration with the MOSH Noise Team and endorsed by the CEO Zero Harm Leadership Forum. The strategy is built around four core pillars:

1. Leading Practices & Research Integration

Promoting the adoption of proven noise control measures and continuous research to guide future interventions.

2. OEM Engagement Strategies

Collaborating with Original Equipment Manufacturers to design, procure, and maintain quieter machinery.

3. Residual Noise Risk Management

Managing the risks that remain even after control measures are implemented, including administrative and personal protective strategies.

4. Acoustic Engineering in Workplace Design

Embedding acoustic control principles into the physical design and layout of workplaces to systematically reduce exposure.

He stressed that “noise is an engineering problem” and must be addressed accordingly by equipping and empowering engineers not only to solve the issue but to own the risk. Compliance with Section 21 of the Mine Health and Safety Act, as well as active participation in the “Buy and Maintain Quiet” Initiative, should be treated as non-negotiable standards across the sector.

Finally, Mr Dunne emphasized that real success would rely on a multi-stakeholder, collaborative approach, combining leadership commitment, engineering expertise, regulatory enforcement, and operational discipline. “We must ensure that every piece of equipment procured is not only fit for purpose, but also

safe and quiet—and that it stays that way throughout its operational life." He concluded by framing the day's convention as a critical platform for accelerating these efforts and translating technical knowledge into industry-wide action.

2.2 Professor Nomfundo Nzuza-Moroe – Setting the Scene

The presentation by Prof Nzuza-Moroe at the Engineering Controls Convention was used to set the scene by outlines strategies for mitigating noise in mining environments through engineering controls. It highlighted the importance of integrating noise management early in mine design, including noise mapping and predictive modelling. She referenced the outcomes of international studies by emphasizing workplace redesign, sound barriers, acoustic curtains, and equipment retrofitting as effective interventions.

2.3 Mathapelo Magampa – Statistics, Milestones, and Research

Ms Magampa presented statistical insights into the prevalence of NIHL, noting a significant reduction in cases from 1536 in 2014 to 702 in 2024. Her presentation also reviewed the SAMI's noise milestones, including the 2024 Noise Milestones Action Plan to mitigate NIHL. Additionally, she presented the research that the Mine Health and Safety Council (MHSC) is currently busy with, citing the need to pursue new research and development in areas like Artificial Intelligence (AI), real-time monitoring and virtual reality, which are required to strengthen noise risk management strategies.

2.4 Willie Deysel – Health and Milestone Performance

Mr Deysel provided an overview of the health and milestone performance within the South African mining industry. He discussed the systems in place for monitoring noise exposure and the data required to assess compliance with established milestones. Mr Deysel presented data on equipment noise reduction, noting a decrease from 3131 pieces exceeding noise milestones in 2015 to 1121 in 2024.

2.5 Dr. Ben van Zyl – The Fundamentals of Acoustic Engineering

Dr. Ben van Zyl delved into the fundamentals of acoustic engineering, illustrating case studies and examples of engineering controls implemented to reduce noise exposure. He highlighted the differences between workplace and environmental noise and emphasized the need for holistic assessment, quantification of impact, and strategic design in noise control measures.

3 THEME 2 - ACOUSTIC ENGINEERING

3.1 Brett Robinson – The Application of Acoustic Cameras

Mr Robinson discussed the application of acoustic cameras in noise control, focusing on how frequency analysis plays a role in identifying noise sources. He addressed the importance of microphone arrays in collecting data and demonstrated the dynamic range capabilities of acoustic cameras through video examples. Mr Robinson concluded by outlining the capabilities and limitations of acoustic cameras in noise identification.

3.2 Lefa Makara – OEM Engagement Strategy

Mr Makara shared Glencore's journey in internalizing the Industry Buy Quiet and Maintain Quiet Initiative (IBMQI) suite of documents. He discussed the company's aspirational target of 100dB for equipment noise levels, anticipating future reductions in milestones. Mr Makara emphasized the importance of risk prioritization, engaging Original Equipment Manufacturers (OEMs), and implementing suggested controls as part of a comprehensive OEM engagement strategy.

3.3 Vhusani Mgimeti – Acoustic Control Innovations for Iron Ore Crushing Plants

Mr Mgimeti presented a roadmap highlighting key points in the journey to silencing vibration screens in iron ore crushing plants. He outlined the communication strategy, acoustic engineer involvement, solutions implemented, and the resulting noise reduction from 113dB to 102dB. Mr Mgimeti also discussed the frequency analysis conducted and the cost-benefit report that showcased the value case, noting an improvement in worker exposure from a B-Heg to a C-Heg.

3.4 Humbelani Phunge – Alternative Power Sources in Noise Risk Management

Mr Phunge shared insights into the noise reduction impact of transitioning from diesel-powered Load-Haul-Dump (LHD) machines to battery-operated LHDs. As part of ASSMANG's key technology focus areas, he discussed the noise levels of the equipment and personal dose measurements, highlighting a reduction from 104dB to 83dB in equipment noise levels and a decrease in personal dose from 89dB to 82dB. Mr Phunge also addressed alternative risk mitigation considerations, such as fire safety measures for battery charging stations.

4 THEME 2 - NOISE PREDICTION

4.1 Duduzile Skhosana – Noise Prediction Model

Ms Skhosana presented a noise prediction model utilizing noise contour maps. She discussed key factors influencing noise exposure, including frequency analysis, real-world data, and engineering controls. Ms Skhosana emphasized that different frequencies affect individuals differently, necessitating tailored strategies for effective noise control.

4.2 David Nkawana – NIHL Loss Prediction Model

Mr Nkawana introduced the application of AI in occupational health, specifically in predicting NIHL outcomes. He explained various subsets of AI, including deep learning, neural networks, and machine learning, and their relevance in public health applications. Nkawana demonstrated a live NIHL prediction model, highlighting the importance of accurate data inputs for reliable outcomes.

5 CLOSING SESSION

5.1 Stanford Malatji – Closing Remarks

Stanford Malatji concluded the convention by providing a brief overview of the day's discussions. He emphasized the importance of internalizing and adopting the learnings from the convention at operational levels to achieve the collective goal of eliminating NIHL in the mining industry.

6 RECOMMENDATIONS

Adopt a Hierarchical Noise Control Approach

- Prioritize the implementation of engineering controls at the source of noise, followed by administrative measures, to systematically reduce occupational noise exposure in mining operations.
- Monitor the use of Hearing Protection Devices (HPDs) to ensure compliance.
- Provide employees with comfortable yet effective HPDs tailored to their work environment.

Invest in Technological Innovations

Leverage modern technologies to enhance noise control strategies, including:

- Acoustic cameras for visualizing noise sources.
- AI-based noise prediction models for proactive planning.
- Real-time monitoring systems to track and manage noise exposure continuously.

Engage Stakeholders Collaboratively

Encourage collaboration among mining companies, OEMs, research institutions, and regulatory bodies to:

- Develop integrated noise management strategies.
- Share best practices and innovations across the industry.
- Align on standards and compliance frameworks.

Promote Continuous Education and Awareness

Drive a culture of awareness and accountability through:

- Regular training programs, campaigns, and workshops.
- Targeted communication to ensure all employees; from management to frontline workers; understand the health risks associated with noise exposure and their individual responsibilities.

Monitor Industry Progress and Drive Continuous Improvement

- Implement robust workplans and set measurable objectives for noise control.
- Utilize continuous real-time monitoring to detect potential overexposures before Noise-Induced Hearing Loss (NIHL) can occur.
- Regularly report on progress and adjust strategies to sustain momentum toward industry-wide improvement.

7 CONCLUSION

The Noise Engineering Controls Convention provided a comprehensive platform for sharing knowledge and strategies aimed at mitigating noise exposure and preventing NIHL in the SAMI. Through expert presentations and collaborative discussions, the convention underscored the industry's commitment to achieving the MHSC milestone of reducing operational and equipment noise levels to below 104dB(A) by December 2034 and ultimately eliminating NIHL.

A copy of the Agenda and the Speaker presentations are available on the MOSH Webpage at <https://www.mosh.co.za/noise/events>: **EVENTS - MINING INDUSTRY OCCUPATIONAL SAFETY & HEALTH**

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