Biography

Mothusi Mochubele completed his undergraduate studies in BSc Engineering in Mining at the University of the Witwatersrand in 1998. He then joined De Beers Consolidated mine and worked at Cullinan Mine, first as a miner, then shift boss, Mine captain ,section manager and Expansion project Mining Engineer. During his time in De Beers, he obtained government's mine managers' certificate of competency in 2001; and Project Management through UNISA in 2007. Mothusi has also vast experience in Gold mining, Chrome mining, Coal mining, petrochemical and energy sectors in a capacity of engineer, project manager and section lead.

In 2011, Mothusi was appointed by the University of the Witwatersrand as a lecturer in the School of Mining Engineering. While at Wits, Mothusi obtained his MSc Engineering (mining) specialising in ventilation in 2015. He is lecturing Mine Ventilation and Health and Safety courses in undergraduate level and postgraduate level. He has undertaken project commissioned by World Bank where he was country consultant (South Africa) for ACET on Local Content and value Addition. He was a mining consultant for a NEPAD project which is headed by Health Focus reviewing mining regulations for four countries namely: Malawi, Zambia, Mozambique and Lesotho.

His research interest lies in the field of Local Content and Value Addition (LCVA) in mining, property development, health and safety, ventilation in ultra-deep mines as well as Automation. Mothusi has uncontrolled passion to see people succeeding in business.

Paki Seroba is a Wits University Mining Graduate who is currently doing his internship at Sibanye Stillwater.

MINERALS COUNCIL SOUTH AFRICA

A Call for Oversight: Establishing Transparent and Scientific Dust Control Evaluation in the SAMI

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Sibanye Stillwater graduate intern(mining)

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UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG

SCHOOL OF MINING ENGINEERING

Presentation Outline

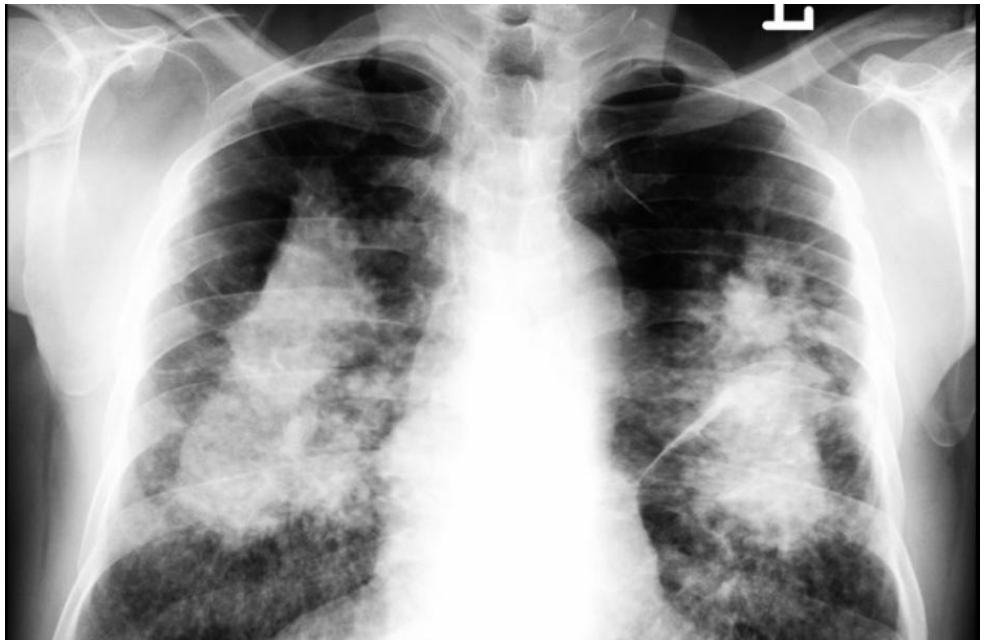
- INTRODUCTION
- PROBLEM STATEMENT
- AIMS & OBJECTIVES
- RESEARCH METHODOLOGY
- LITERATURE REVIEW
- FINDINGS & DISCUSSION
- CONCLUSION

Introduction

- Why are the incidence rates of Silicosis and TB high in SA compared to
  - Canda
  - Australia &
  - UK

?

Strict controls, effective monitoring & health surveillance programs

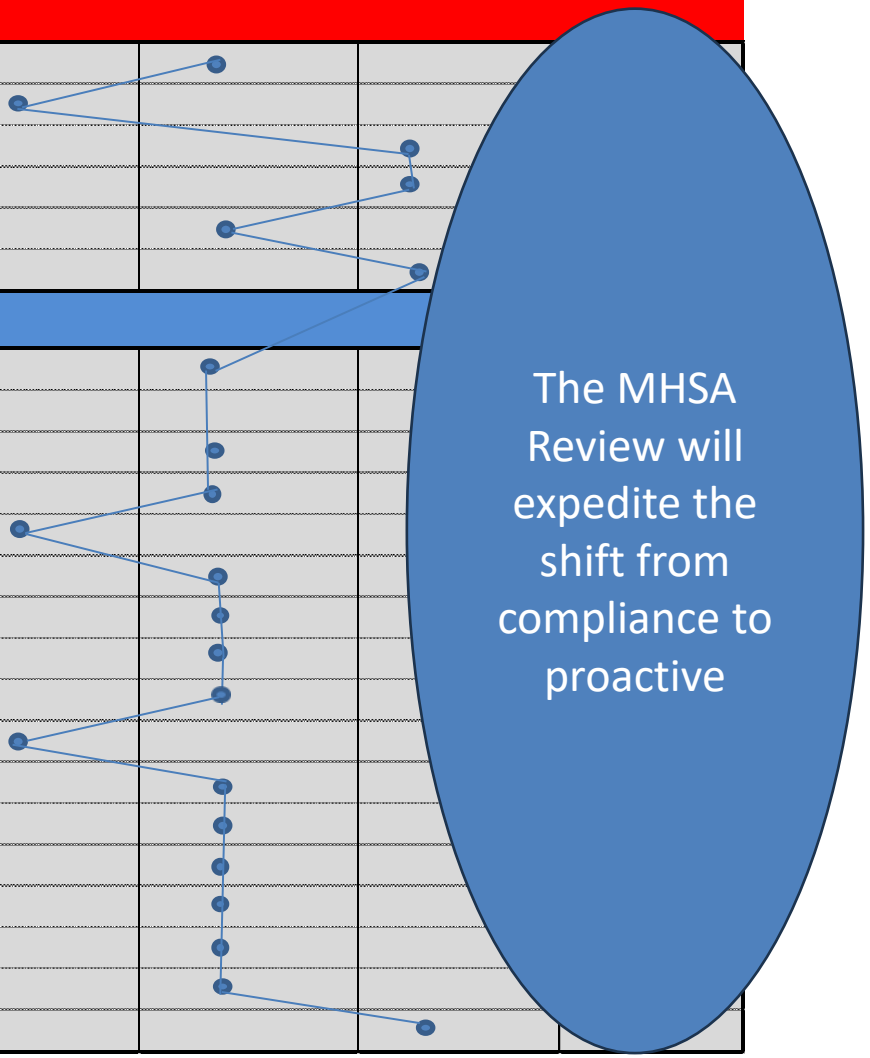


(Van Vuuren, 2017)

- Challenges with dust exposure:
  - Susceptibility to mycobacterium
  - Reactivate latent bacteria
- Systemic challenge – focus on compliance
- Review of MHSA – An impetus to change

Risk Maturity Journey

		Basic	Reactive	Compliant	Proactive	Resilient
	People categories					
P1	Personal risk attitude					
P2	Caring and respecting					
P3	Management leadership and commitment					
P4	Safety Accountability					
P5	Workforce involvement and consultation					
P6	Coaching and mentoring					
	System Categories					
S1	Risk Management Adoption					
S2	Strategic Planning					
S3	Project & process Design Management					
S4	Major/Priority Risk ID &Mngmt					
S5	Change Mngmnt					
S6	Job and task Planning					
S7	Hazard ID & Reporting					
S8	Training and competency					
S9	Communications					
S10	Knowledge mngmnt					
S11	Maintenance					
S12	Procurement					
S13	Contract Mngmnt					
S14	Incident Investigation & Analysis					
S15	Emergency response					
S16	Performance Measurement					
S17	Monitoring and auditing					



The MHSA Review will expedite the shift from compliance to proactive

Problem Statement

- Despite reported efficiencies of up to **95%**, dust-related illnesses **remain prevalent**
- Silicosis and TB prevalence in SAMI;
  - Silicosis: over 13 000 cases (2008-2020); 4.5 per 10 000
  - Pulmonary TB: 36 000 cases ;15.2 per 10 000
- **The MHSA Bill will render some mines economically unviable**

Aims and Objectives

Aim: Establish a **credible evaluation system – Engineering dust control**

Study Objectives:

- Establish correlation between reported and actual Performance
- Establish gaps in current testing protocol
- Benchmark South Africa against first world countries

Research Methods

Methodology:

- Desktop study
- **Sources:**
  - ❖ Academic papers,
  - ❖ Industry reports,
  - ❖ case studies.
- **Focused on:**
  - ❖ Fogger spray,
  - ❖ In-stope atomisers,
  - ❖ Filtration systems.

Literature Review

- Limited **scientific studies validating** dust system performance
- Missing key parameters evaluation:
  - ❖ Dust type,
  - ❖ Droplet size,
  - ❖ Spray angle; and
  - ❖ Dust particle size.

Literature Review

Lessons from Global Leaders

- Validated spray variables performance
  - ❖ Nozzle type & angle
  - ❖ Spray geometry
  - ❖ Droplet size
- laboratory test rigs and on-site trials
  - ❖ 90% capture efficiency validated

China

Literature Review

Multi-characteristic experimental platform of the spray field.

(Cheng Guo,2020)

China

Literature review

Lessons from Global Leaders

Australia

- Transparent public dust databases;
- Real-time monitoring.

Findings

The credibility gap:

- SA reports efficiencies of 70–95%
  - Often based on manufacturer claims
- Silicosis cases reported (2008–2020)
  - TB: 36 000 (Minerals Council,2022)
  - Silicosis: 13 000 (Minerals Council,2022)

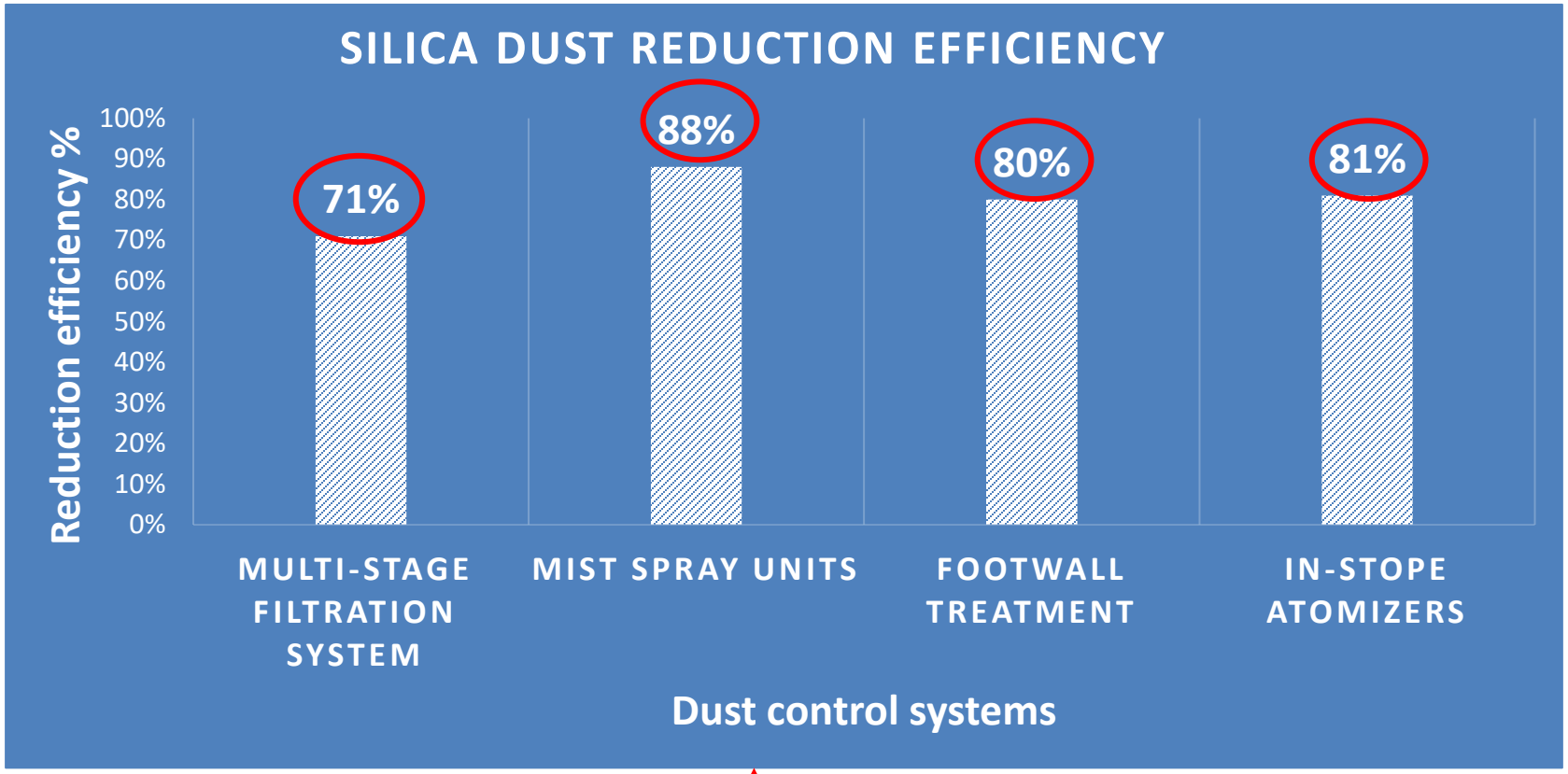
Findings

The credibility gap cont… :

- Lack of independent testing & transparency
  - ❖ Mining industry occupational safety and health(MOSH)
- Data self-reported by mines
  - ❖ Dust over-exposures

Findings

MOSH performance of dust reduction systems



Lack of correlation

- OEL: 0.100 mg/m^3
- STEL
- Ceiling

Findings

Shortcomings of instruments:

- TWA-based reporting hides peak exposures
- AQI, HEGs categories mask actual dust levels (mg/m^3)
- Compliance with the 2024 MHSC milestones?
  - ❖ Lack of transparency and independency

Discussion

The Systemic Gap in Testing and Oversight:

- No independent national testing authority
- Poor standardisation across dust suppression testing
- Coal-based findings applied to gold mines
  - ❖ 88% of silicosis cases come from the gold sector in 2022
  - ❖ 21.4 per 10 000 silicosis incidence rate (Mine health and safety inspectorate,2024)

Discussion

The Proposal: Establish a Dust Testing Centre

- Mandate: real-time & lab testing, validation, and open reporting
- 4Rs of sampling:
  - ❖ Real-time;
  - ❖ Reproducible;
  - ❖ Representative; and
  - ❖ Readily Interpretable

Conclusion

Moving from Assumption to Evidence:

- Support development of a national dust testing facility
- Promote
  - ❖ Independent validation;
  - ❖ Transparent databases; and
  - ❖ Collaboration across industry, academia, & regulators