Biography

Brian Mongoma

Qualifications:

- B-Tech Environmental Health
- Certificate in Mine Environmental Control
- Masters in Public Health from WITS

Professional Career:

- Technical Advisor Occupational Hygiene - Department of Mineral Resources and Energy
- Deputy Head/Occupational Hygienist – Minerals Council South Africa
- Occupational Health Manager – Transnet Freight Rail
- Regional Occupational Hygienist – DRD Gold Mine

Affiliations with Professional Organisations:

- South African Institute for Occupational Hygiene
- Mine Ventilation Society of South Africa

Career Highlights:

- Part-time lecturing at WITS Technikon.
- Being an Occupational health manager (National Level) at Transnet Freight Rail
- Was Vice Chair of the SAIOH PCC.
- Member of MHSC tripartite structures i.e., SIMRAC, MOHAC, TTC.

MINERALS COUNCIL SOUTH AFRICA

DMPR

DUST CONFERENCE

Overview of Occupational Health Performance

"Turning A New Leaf On Dust Risk Management Within The South African Mining Industry"

Presented by: BT Mongoma
Technical Advisor: Occupational Hygiene
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mineral & petroleum resources
Department:
Mineral and Petroleum Resources
REPUBLIC OF SOUTH AFRICA

G20 SOUTH AFRICA 2025

Outline

- Machinery Of Government at Work
- Aligning Occupational Dust Exposure with National and Global Development Frameworks
- Airborne Pollutants Exposure Stats
- Occupational Diseases
- Contributing Factors
- Emerging Dust Issues in SAMI
- Turning A New Leaf In Dust Risk Management

DUST EXPOSURE

EXPOSURE TO RESPIRABLE CRYSTALLINE SILICA REMAINS A LEADING OCCUPATIONAL HEALTH HAZARD IN SOUTH

MACHINERY OF GOVERNMENT AT WORK

Mine Health and Safety Act (MHSA) No. 29 of 1996:

- Mandates employers to maintain safe, dust-controlled environments in mines and emphasizes the importance of dust mitigation practices.

Constitution of the Republic of South Africa, 1996

- Provides the supreme legal foundation for all laws and policies, including those that regulate dust exposure in the workplace. While the Constitution doesn't mention "dust" specifically, several of its provisions are directly relevant to occupational exposure to dust and the associated risks to health, dignity, life, and the environment

National Environmental Management Act (NEMA) No. 107 of 1998

- Regulates activities that impact the environment, including dust management, to protect community health.

Basic Conditions of Employment Act (BCEA) No. 75 of 1997

- Regulates activities that impact the environment, including dust management, to protect community health.

MACHINERY OF GOVERNMENT AT WORK
MHSA SECTIONS

Section 2	Employer to ensure safety
Section 5	Employer to ensure mine is safe and without risk
Section 9	Codes of Practice — Airborne Pollutants, quality assurance, Minimum Standards of Fitness to Perform work at a Mine.
Section 11	Risk Assessments
Section 12	Occupational Hygiene Programme
Section 13	Medical Surveillance
Section 23	Employees' right to leave dangerous working place
Section 48(3) & 50	Enforcement of compliance with dust exposure limits and COPs. CIOM–OH-01-2024 “Instruction on prevention of occupational hygiene overexposures”
Section 49(4)(e)	CIOM may require all mines or groups of mines to prepare and implement a hazard management system for significant hazards mentioned under section 11

MACHINERY OF GOVERNMENT AT WORK
MHSA REGULATIONS

Regulation 9.1(1)	No person may use, or permit any person to use, compressed air.
Regulation 9.1(2)	The employer must provide an early warning system or systems at all working places
Regulation 9.1(4)	No employee is exposed to any health hazard at, or emanating from, any working place where work has ceased, either temporarily or permanently
Regulation 9.2(1)	Occupational exposure to health hazards of employees is maintained below the limits set out in Schedule 22.9(2)(a) and (b).
Regulation 9.2(2)	The employer must establish and maintain a system of occupational hygiene measurements, as contemplated in section 12.
Regulation 9.2(3)	The employer must establish and maintain a system of occupational hygiene measurements, as contemplated in section 12.

MACHINERY OF GOVERNMENT AT WORK MHSA

Regulation 9.2(5)(a)	The employer must provide and maintain suitable and adequate change houses to enable employees who perform work involving hazardous substances to change into working clothes at the start of their shift and to wash themselves and change their clothes at the end of their shift
Regulation 9.2(5)(b)	The employer must provide and maintain suitable and adequate facilities to enable employees who perform work involving hazardous substances to wash their hands and faces before eating any meals at work.
Regulation 9.2(6)	No employee may remove clothes referred to in regulation 9.2(5)(a) from the mine unless such clothes have been decontaminated.
Regulation 9.2(7)	Employer to report to the Regional Principal Inspector
Regulation 9.2(8)	Employer must provide RPE that complies with SANAS requirements.
Regulation 11	Medical surveillance

MACHINERY OF GOVERNMENT AT WORK

Constitution of the Republic of South Africa

SECTION	TEXT (SUMMARY)	RELEVANCE TO DUST EXPOSURE
Section 9(2) – Equality	Equality includes the full and equal enjoyment of all rights and freedoms.	Many mineworkers affected by dust are historically disadvantaged; protecting them supports substantive equality.
Section 10 – *Human dignity*	Everyone has inherent dignity and the right to have their dignity respected and protected	Unsafe and unhealthy working conditions (such as uncontrolled dust exposure) undermine workers' dignity.
Section 11 – *Right to life*	Everyone has the right to life	Prolonged or acute dust exposure may lead to fatal diseases (e.g., silicosis, TB), violating this fundamental right.

MACHINERY OF GOVERNMENT AT WORK

Constitution of the Republic of South Africa

SECTION	TEXT (SUMMARY)	RELEVANCE TO DUST EXPOSURE
Section 24(a) – Environment	Everyone has the right to an environment that is not harmful to their health or well-being	Dust exposure (e.g., respirable crystalline silica) in mines or workplaces infringes this right when it endangers workers' health.
Section 27(1)(a) – Health care	Everyone has the right to have access to health care services	This creates a duty to prevent occupational diseases through regulation, monitoring, and enforcement.
Section 33 – Just administrative action	Everyone has the right to fair, lawful and reasonable administrative action	Workers or communities affected by dust exposure are entitled to fair treatment and recourse against employers or regulators.

Aligning Occupational Dust Exposure with National and Global Development Frameworks

National Development Plan (NDP) Vision 2030	**Alignment:** The NDP Vision 2030 calls for a skilled, healthy workforce that drives economic growth and productivity. Reducing respiratory diseases from dust exposure aligns with the NDP's vision of a productive and inclusive economy by 2030. **Key Connections**: Workplace Safety and Health: The NDP prioritizes creating a safe, regulated mining sector that prevents occupational diseases. Gender Equality in the Workforce: By addressing health risks specific to women in mining, we contribute to the NDP's call for greater gender equality and participation in the economy.
Medium Term Strategic Framework (MTSF)	**Alignment:** The MTSF emphasizes job creation, social cohesion, and a healthier workforce to drive sustainable growth. Reducing dust exposure in mining aligns with MTSF's objective to protect workers' health and improve workplace conditions. **Key Connections:** Improved Health Outcomes: Addressing occupational dust exposure supports MTSF's goals of reducing occupational health hazards. Inclusive Growth: Prioritizing safer work environments for women in mining addresses gender inequality, a focus area in MTSF.

Aligning Occupational Dust Exposure with National and Global Development Frameworks

Sustainable Goals

Alignment: Occupational dust exposure is directly linked to several SDGs aimed at improving health, reducing inequality, and promoting safe work environments.

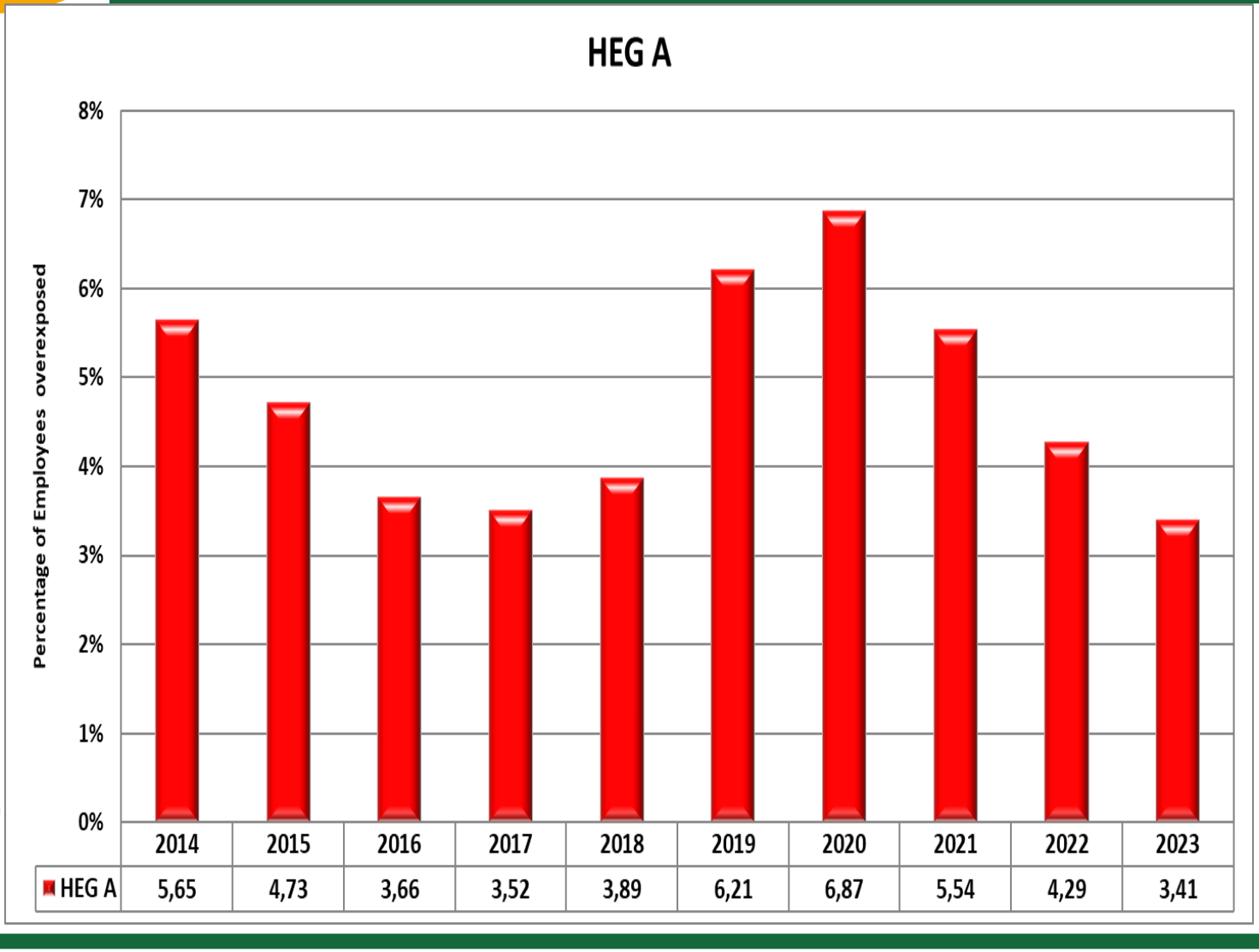
SDG 3 – Good Health and Well-being: Reducing dust exposure contributes to SDG 3 by decreasing the incidence of occupational respiratory diseases.

SDG 5 – Gender Equality: Creating safer working conditions for female miners addresses SDG 5 by enabling gender equality in the Workplace.

SDG 8 – Decent Work and Economic Growth: Aligns with the SDG goal to promote inclusive and sustainable economic growth through improved working conditions.

SDG 15 – Life on Land: By minimizing dust pollution from mining activities, we support SDG 15, which promotes protecting terrestrial ecosystems

AIRBORNE POLLUTANTS - NATIONAL



	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
HEG A	5,65	4,73	3,66	3,52	3,89	6,21	6,87	5,54	4,29	3,41

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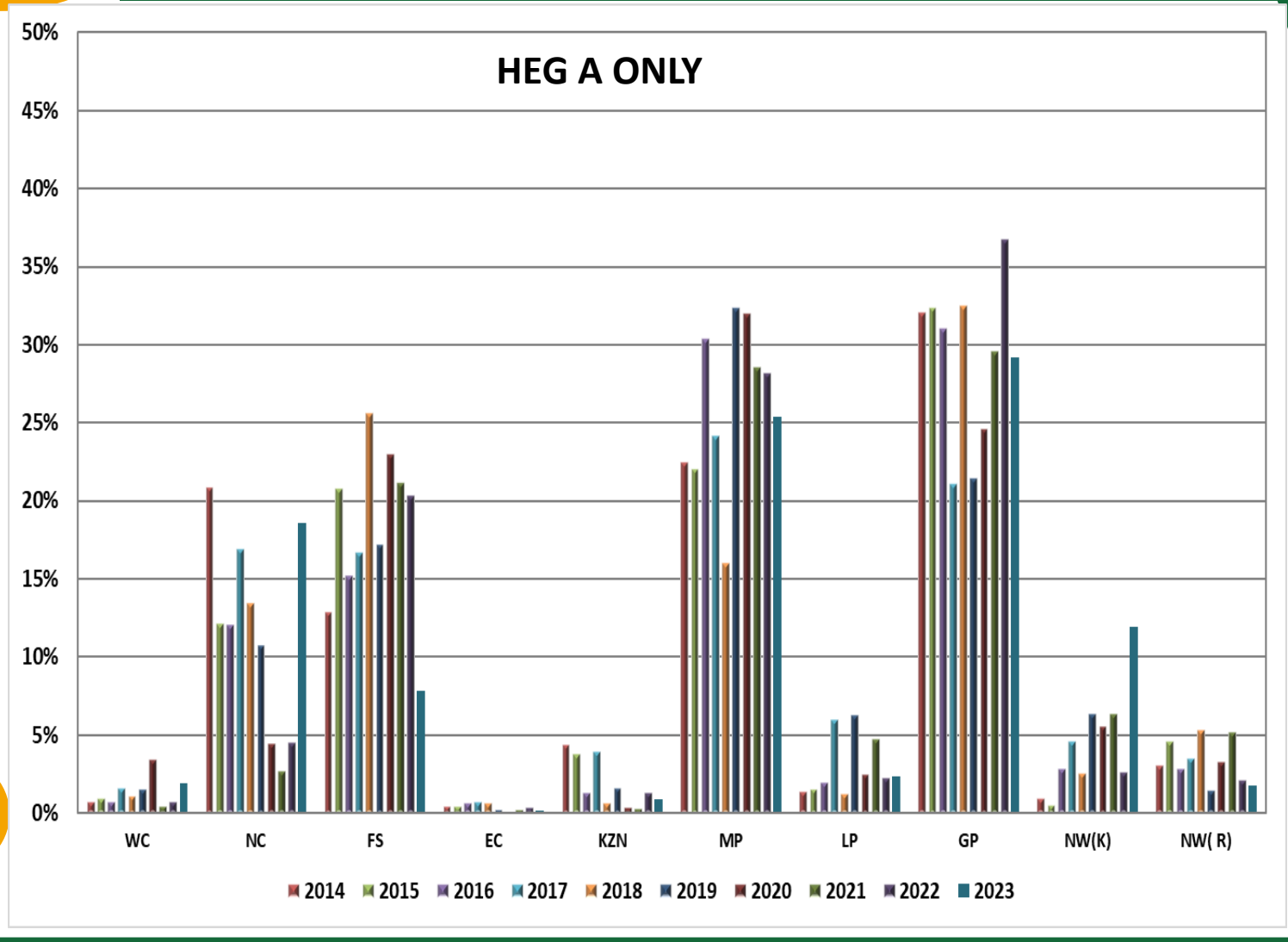
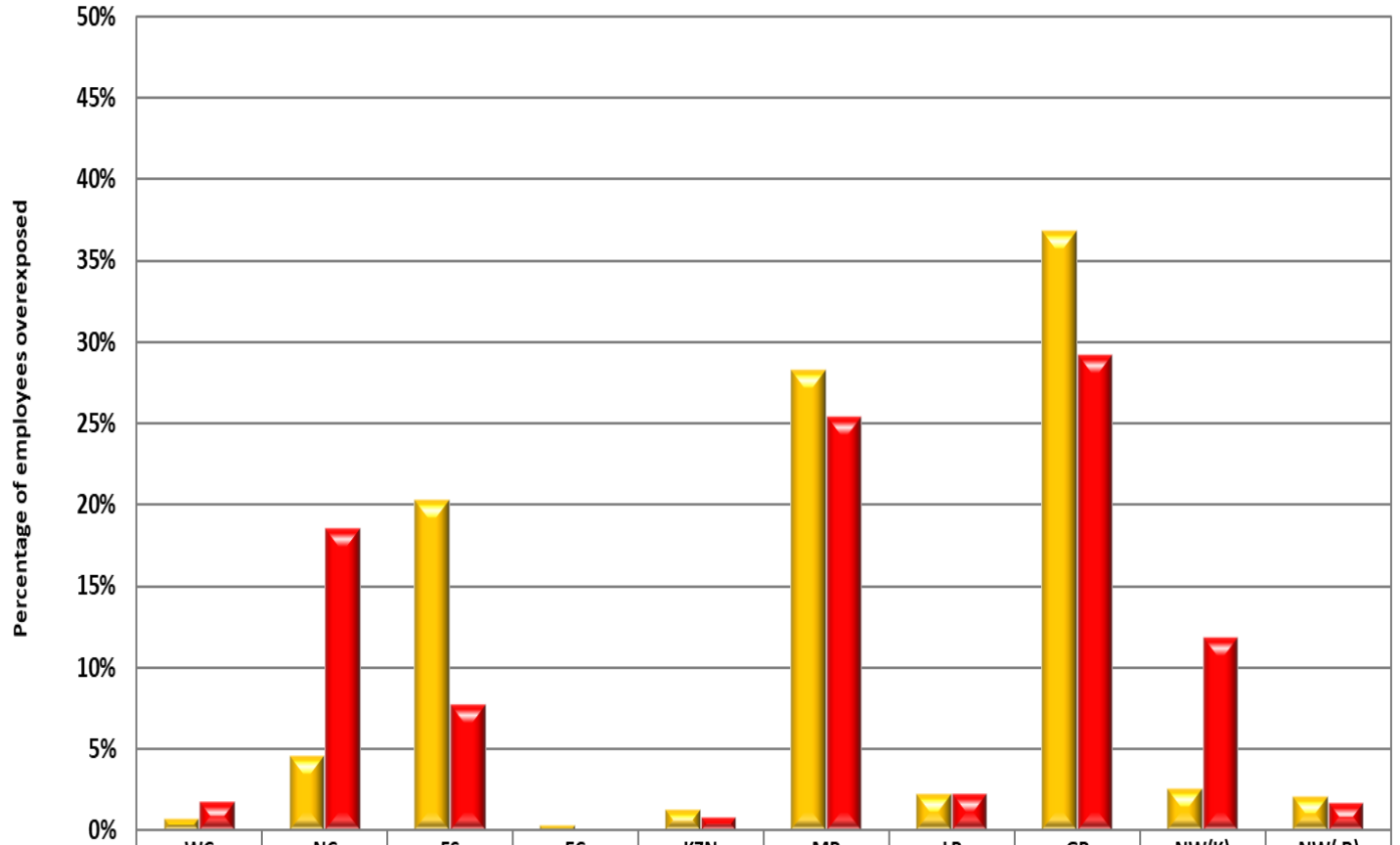
AIRBORNE POLLUTANTS - REGIONAL



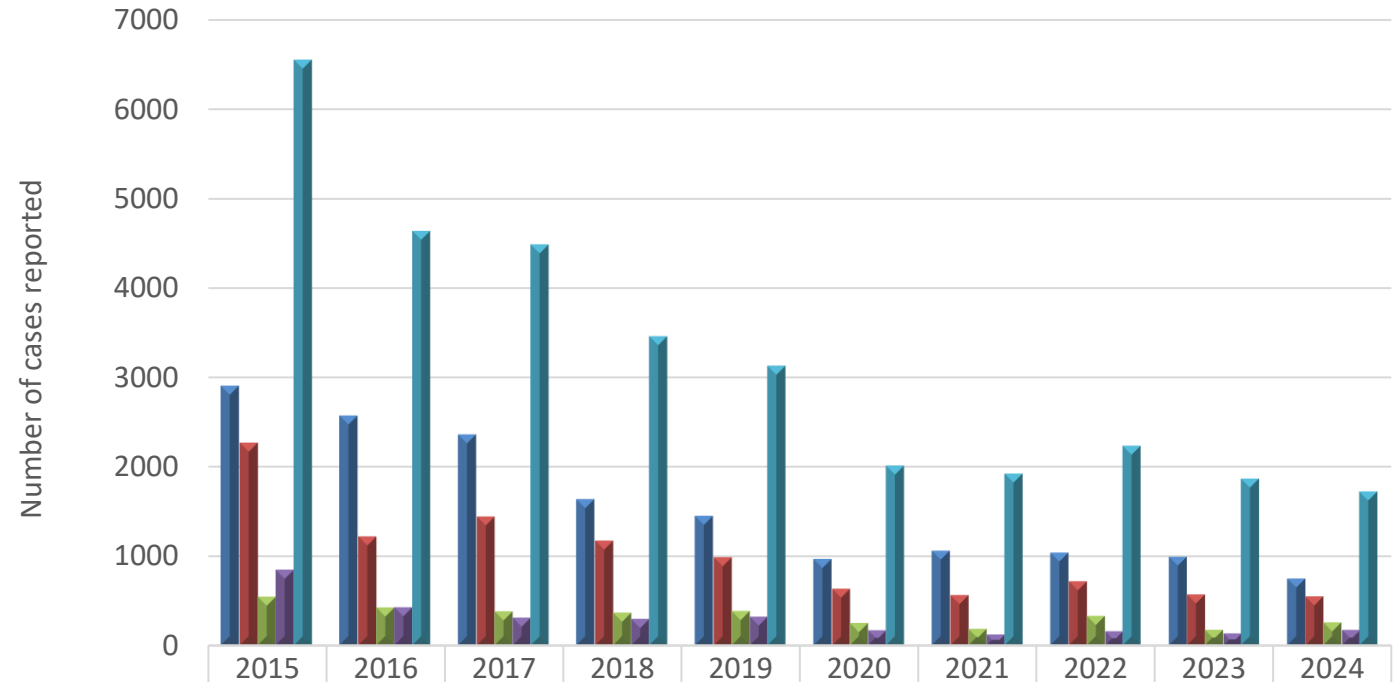
AIRBORNE POLLUTANTS - REGIONAL

2022 vs 2023



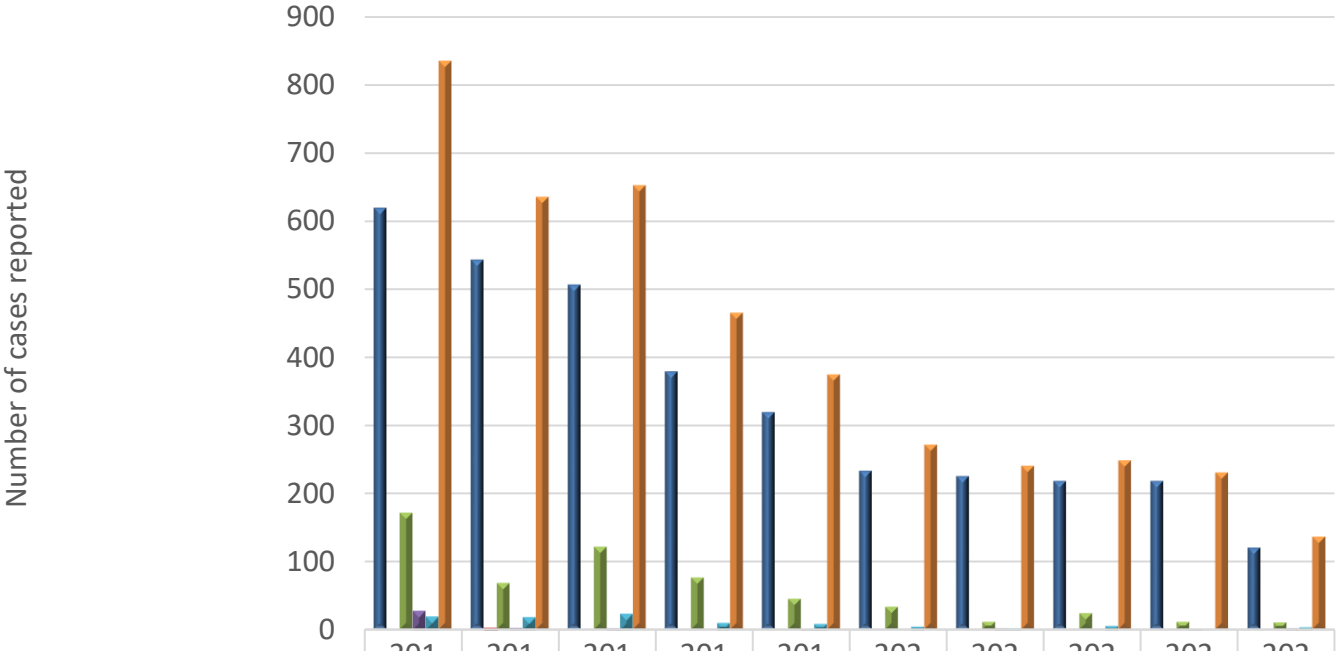
	WC	NC	FS	EC	KZN	MP	LP	GP	NW(K)	NW(R)
2022	0,83	4,66	20,38	0,44	1,39	28,26	2,32	36,81	2,71	2,19
2023	1,89	18,60	7,83	0,16	0,89	25,39	2,39	29,17	11,91	1,76

TOTAL OCCUPATIONAL DISEASES REPORTED BY MINES



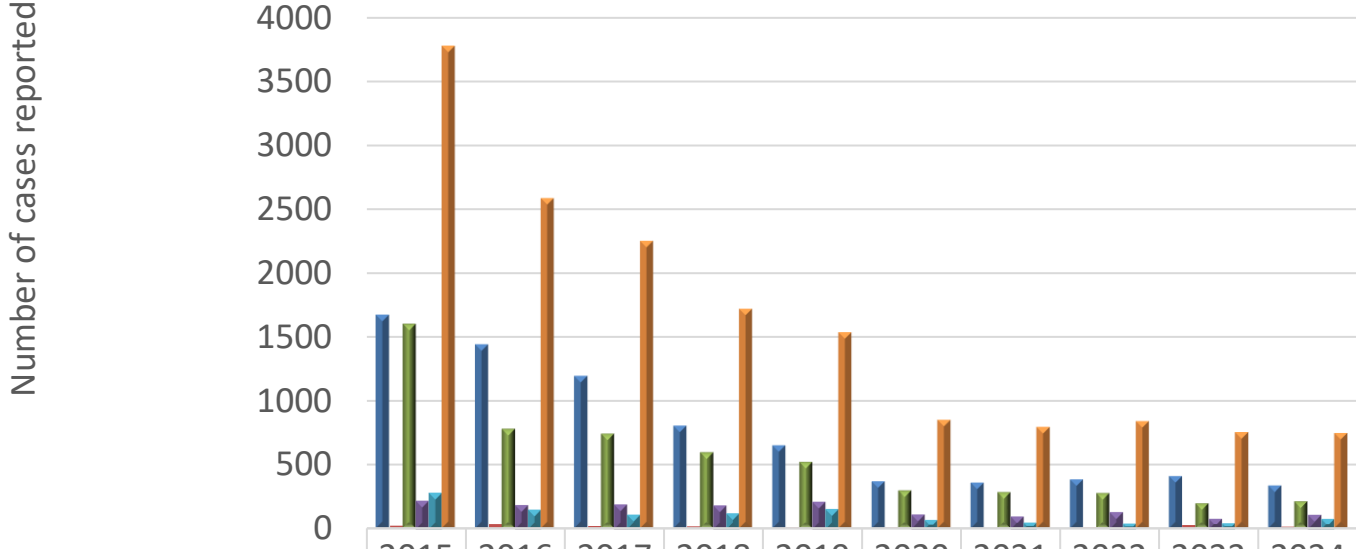
	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Gold	2903	2572	2360	1637	1449	967	1058	1037	991	749
Platinum	2263	1218	1440	1169	983	632	563	716	568	548
Coal	536	420	375	360	379	247	181	324	172	254
Other mines	838	422	308	292	319	167	122	156	133	172
Total	6540	4632	4483	3458	3130	2013	1924	2233	1864	1723

SILICOSIS CASES



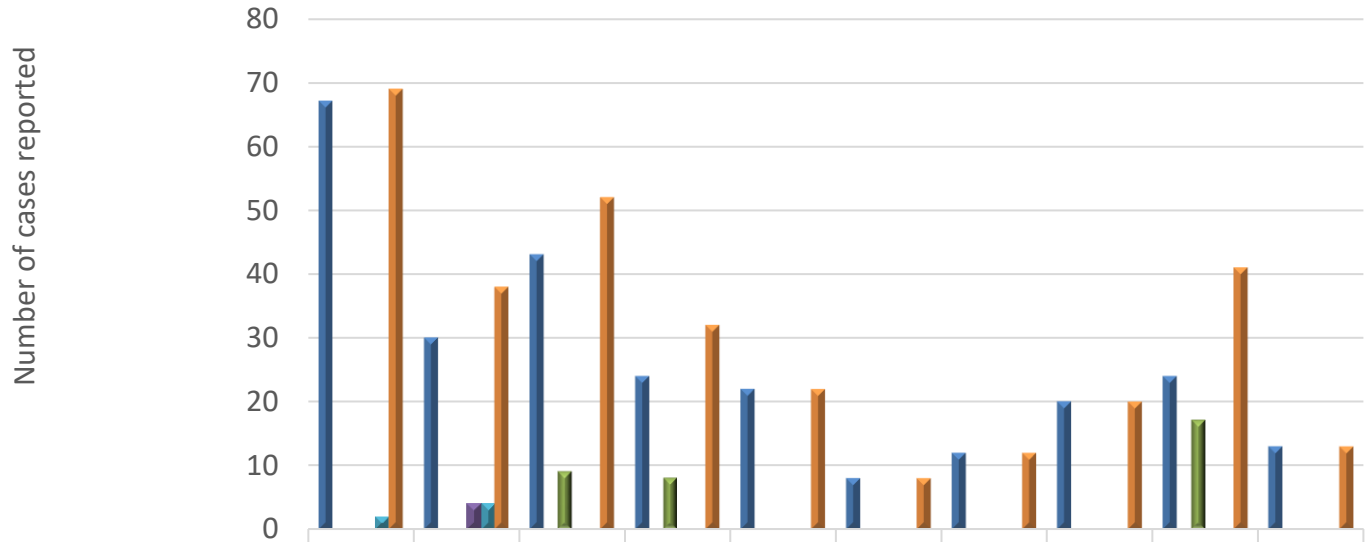
	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Gold mines	619	543	506	379	319	233	225	218	218	120
Diamond mines	0	3	0	0	0	0	0	0	0	0
Platinum mines	171	68	121	76	45	33	11	24	11	10
Coal mines	26	3	2	0	1	0	2	0	1	2
All Other mines	19	18	23	10	9	5	2	6	0	4
Total cases-Nationally	835	635	652	465	374	271	240	248	230	136

PULMONARY TUBERCULOSIS CASES



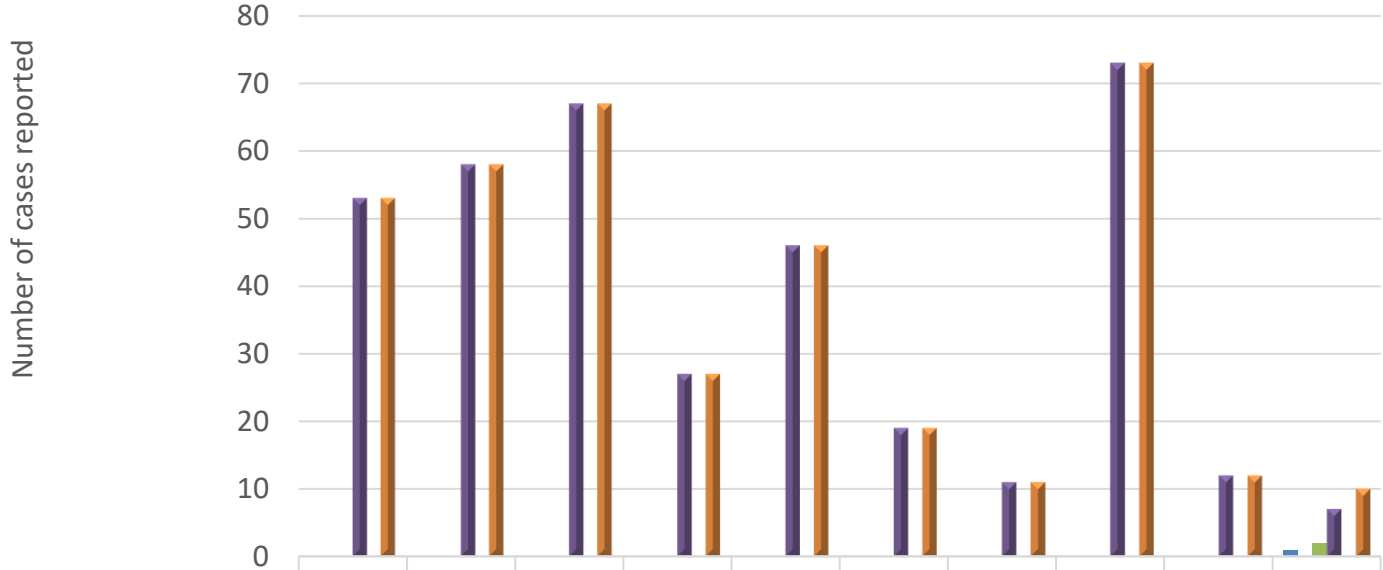
	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Gold mines	1666	1436	1190	801	648	367	358	383	406	334
Diamond mines	20	34	18	17	6	5	3	6	26	14
Platinum mines	1597	778	741	596	519	297	285	277	197	211
Coal mines	213	182	186	180	206	110	97	129	79	109
All Other mines	277	150	112	122	154	70	50	44	46	78
Total cases -Nationally	3773	2580	2247	1716	1533	849	793	839	754	746

SILICO-TUBERCULOSIS CASES



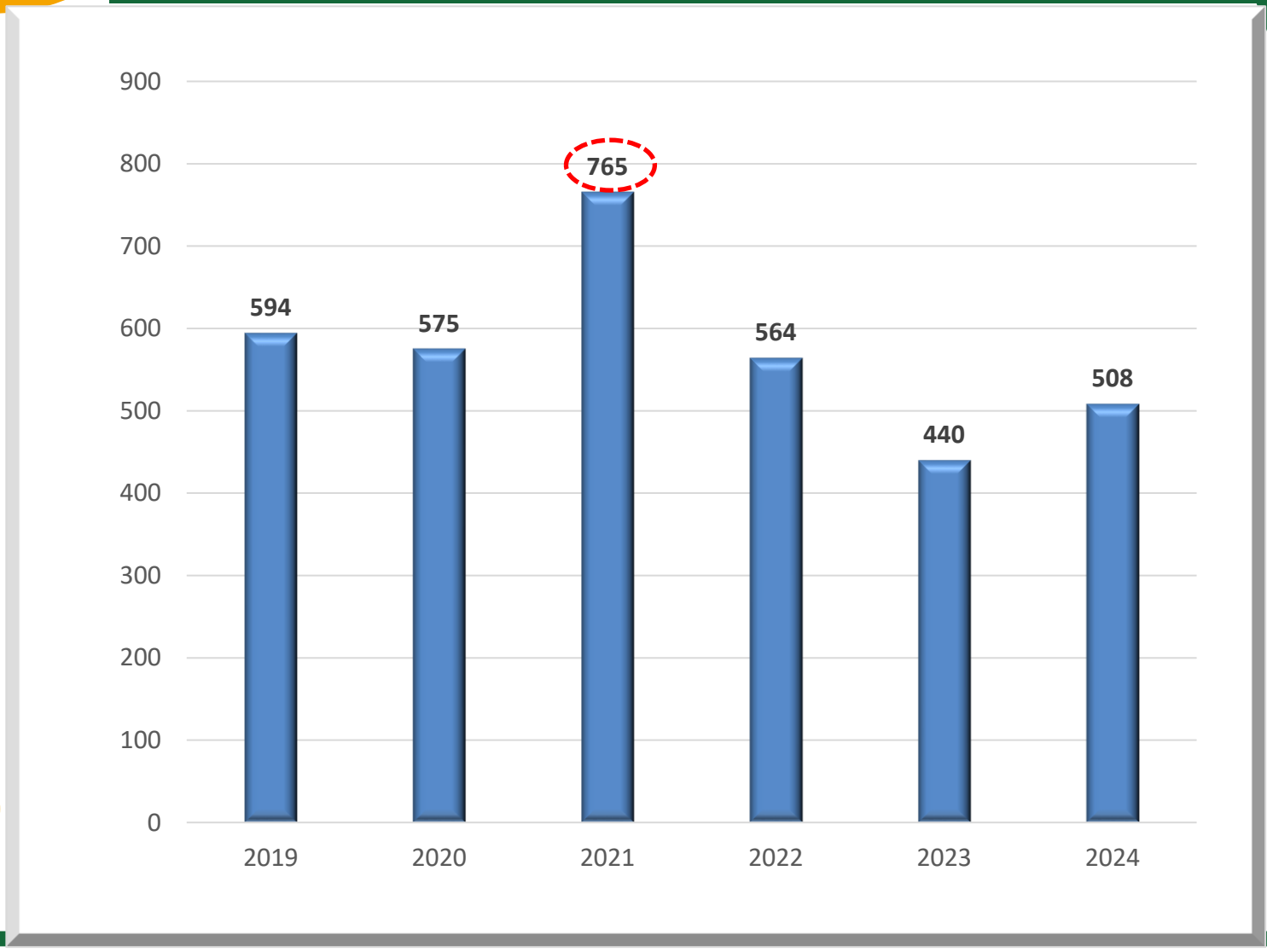
	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Gold mines	67	30	43	24	22	8	12	20	24	13
Diamond mines	0	0	0	0	0	0	0	0	0	0
Platinum mines	0	0	9	8	0	0	0	0	17	0
Coal mines	0	4	0	0	0	0	0	0	0	0
All Other mines	2	4	0	0	0	0	0	0	0	0
Total cases nationally	69	38	52	32	22	8	12	20	41	13

COAL WORKER'S PNEUMOCONIOSIS CASES



	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Gold mines	0	0	0	0	0	0	0	0	0	1
Diamond mines	0	0	0	0	0	0	0	0	0	0
Platinum mines	0	0	0	0	0	0	0	0	0	2
Coal mines	53	58	67	27	46	19	11	73	12	7
All Other mines	0	0	0	0	0	0	0	0	0	0
Total cases nationally	53	58	67	27	46	19	11	73	12	10

MEDICAL INCAPACITY DUE TO OCCUPATIONAL DISEASES



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CONTRIBUTING FACTORS TO EXPOSURE

CONTRIBUTING FACTORS TO EXPOSURE

Risk Management Failures	RA outcomes not aligned to issues presented in the COP; jargon inconsistency (significant vs. high risk).
	No action plan to manage significant risks (Hierarchy of controls not applied). H&S committees not engaged in RA reviews or validations.
	Misalignment between RA review frequency (e.g. every 3–5 years) and COP review frequency (e.g. every 2 years or post-incident).
	Risk assessments are not reviewed after incidents, process changes, or exposure exceedances.
	COP updates after incidents/emergencies not conducted.
	Despite regulatory frameworks, enforcement and implementation gaps persist.
	Disconnect between occupational hygiene, engineering, HSE, and production teams.
	Incomplete or outdated data used by the mines.
	Lack of early warning indicators or trend analysis to update risk profiles dynamically.

CONTRIBUTING FACTORS TO EXPOSURE

Technical Failures	Lack of knowledge on conducting RA and only detailing RA outcomes on Excel, no formal detailed reports.
	Lack of mentoring and supervision.
	Inaccurate HEG classifications leading to poor sampling strategies.
	Infrequent or non-representative personal dust monitoring.
	Taking fewer samples than the legal requirement.
	Silica results in most gold mines –BDL without detailed explanation.
	One sample's silica % used for all samples across the year.
	Only reporting silica and PNOC — omitting REEs, ultra fines, or other known contaminants
	Chemical analysis and reporting practices flawed – systemic control gaps.
	REEs not included in Schedule 22 (regulatory and analytical gap).
	Inability/lack of use of AI tools.
	Lack of research and inability to utilize research outcomes to improve exposures .
	Use of part-time occupational hygienists compromises quality.

CONTRIBUTING FACTORS TO EXPOSURE

Leadership and accountability Failures	Risk assessment reports not signed off by employer.
	Failure to act on audit findings, risk assessments, and health surveillance data.
	COP commitments (e.g., incident reviews) not implemented.
	Illnesses among miners affecting productivity and not being escalated/not properly investigated/investigations not chaired by risk owners for accountability.
	Dust control treated as a compliance box-tick rather than a strategic priority.
	Exposure monitoring data not used for operational decision-making.
	Overreliance on outdated or unrepresentative samples to understate risks.
	Late submission of statutory data reports and reports not signed by Engineers.

CONTRIBUTING FACTORS TO EXPOSURE

Control Contributing Failures:	No action plan for significant risks – control hierarchy not implemented.
	Inadequate maintenance of dust control infrastructure (ducts, fans, filters clogging or bypassed).
	Inadequate airborne dust control and poor ventilation designs — failing to dilute or extract dust effectively
	No alarms or triggers for high exposure events.
	Rising healthcare costs due to dust-related illnesses.
	Procedures developed to put employees on long-term disability/early retirement from dust exposure.
	Lack of task-specific control procedures for high-risk operations.
	Inadequate use of Respiratory Protective Equipment (RPE) — workers not fit-tested, trained, or supervised.
	Lack of environmental control systems resulting in spread of mining dust – affects communities and ecosystems.

Emerging Dust Issues in SAMI

Silica exposure in non-gold mines (Chrome, Platinum) → Ultrafine particles (nano-dust) – unmonitored but high risk

Tailings dust exposure in surrounding communities → Inadequate controls during exploration, drilling, and crushing (Inadequately defining the systematic mining process)

Mining of Rear Earth Minerals → Cross-border learnings: Are we benchmarking enough?

TURNING A NEW LEAF IN DUST RISK MANAGEMENT

Traditional approach

- Annual dust sampling
- Activating controls manually
- Use of exposure modelling (estimations based on similar conditions)
- Non-actionable RA
- Excel-based reporting
- Generic COPs
- Part-time hygienists

New Leaf Approach

- Real-time dust monitoring (e.g., wearable sensors or static sensors)
- Controls linked real-time monitoring
- AI Prediction Model
- Control-focused RA (hierarchy)
- Interactive dashboards
- Integrated Digital Platforms
- Site-Specific, Actionable Plans
- In-house full-time teams

TURNING A NEW LEAF IN DUST RISK MANAGEMENT

Challenges and Benefits of IoT (Internet of Things) in Mining

Dust Control:

Current challenges

- Delayed sampling results
- Manual reporting
- Manual reporting

IoT Solution

- Real-time exposure tracking
- Automated data uploads
- SMS alerts for overexposure

TURNING A NEW LEAF IN DUST RISK MANAGEMENT

More benefits of IoT in Mining Dust Control:

- ✓ Assists in collecting, sending, and receiving data through a network of physical devices that are embedded with sensors, software, and connectivity (usually internet or local network);
- ✓ Real-time exposure tracking;
- ✓ Better compliance with exposure limits;
- ✓ Early warning for high-risk areas; and
- ✓ Historical data analysis for planning controls.

TURNING A NEW LEAF IN DUST RISK MANAGEMENT

What Turning a New Leaf Looks Like in Practice:

1. Leadership Commitment
   - Dust risk integrated into board-level HSE discussions
   - Budget allocated for dust control technology upgrades
2. Real-Time, Data-Driven Monitoring
   - Use of IoT-enabled dust sensors across HEGs
   - Mobile alerts for over-threshold dust levels
3. Worker Empowerment
   - Involving employees in dust mapping exercises
   - Tailored dust health training in local languages
4. Transparent Reporting & Accountability
   - Public dashboards on dust levels & health cases
   - Periodic reviews shared with community stakeholders

Reflecting on Dust Risk Management – Time to Be Honest

Let's Reflect: Why Are We Still Failing?

Are RA reports being used as tools or paperwork?

Are control strategies practical and implemented?

Do employees truly understand their dust risks?

Is our monitoring data reliable, representative, valid and complete (to assist the employer to mitigate)?

CONCLUSION

Dust exposure is not just a compliance issue – it's a people and productivity issue.

South Africa's mining industry has the tools, but not always the will or coordination.

Addressing dust exposure promotes safer mining practices that mitigate environmental degradation, helping maintain healthier ecosystems.

By controlling dust exposure, mining operations can contribute to better air quality, benefiting both local communities and wildlife, and fostering sustainable development in mining regions.

CONCLUSION

- ✓ Turning a new leaf means embedding dust controls into culture, not just policy.
- ✓ Let's drive accountability, empower employees, and embrace technology.

ABOVE ALL

The time for change is now. The lives, organs, and livelihoods of our miners depend on it.


The idea you implement is more important than
the ideas you collect.
Sravani Saha Nakhro
Thank You