

# Introduction to the **Toolkit**



# FOREWORD

---

**There have been several achievements made in the effort to reduce the incidence of TB in the mining sector, however, more needs to be done to control dust hazards in the workplace and reduce the incidence of dust-related lung diseases, such as silicosis and TB.**

Silicosis is not curable. Silicosis leads to an increased risk of TB. Prevention of exposure to hazardous dust in the mining workplace is the only way that we may be able to eradicate silicosis. All stakeholders need to be involved in developing and implementing of a shared narrative to eradicate occupational lung diseases. This toolkit contains information and tools for stakeholders involved in collaboratively eliminating the hazards of dust in the mining sector, thereby contributing to a reduction in silicosis and TB.

Policy makers and Legislators have an important role to play in the eradication of dust-related lung diseases through ensuring that legislation and regulations are in place such that mine management is held accountable for the occupational safety and health of mineworkers. Mine inspectorates should also be capacitated so that they may conduct occupational health and safety inspections, have the right tools and resources to do their jobs and the authority to enforce the law if there is an occupational health and safety breach. Unions and civil society organisations have a role in informing mineworkers as to their rights on occupational health and safety and also a role in lobbying government for appropriate occupational safety and health legislation.

The aim of this toolkit is to support countries embarking on the journey of reviewing their occupational health and safety frameworks and developing national dust control programmes. We do hope that you will find the toolkit useful.

*Sincerely*

**Dr Julian Naidoo**  
**Chief of Party – TMS**



# TABLE OF CONTENTS

---

<b>RATIONALE FOR THE TOOLKIT</b>	<b>01</b>
Objectives of the toolkit	03
Target audiences of this toolkit	03
<b>HOW TO USE THIS TOOLKIT</b>	<b>04</b>
Structure of the toolkit	04
<b>SYMBOLS USED IN THIS TOOLKIT</b>	<b>05</b>
<b>GLOSSARY OF TERMS AND DEFINITIONS</b>	<b>06</b>
<b>LIST OF ABBREVIATIONS</b>	<b>08</b>
<b>LIST OF TOOLS</b>	<b>10</b>



# RATIONALE FOR THE TOOLKIT

---

**The World Bank reports that tuberculosis (TB) is one of the world's deadliest diseases and results in the death of three people every minute. The report goes on to say that each year, 9 million people develop TB, and 1.5 million die from the disease.**

TB is a huge problem in the Southern Africa mining sector and in South Africa alone, TB rates within the gold mining workforce are estimated at 2,500-3,000 cases per 100,000 individuals which is 10 times the World Health Organisation (WHO) threshold of 250 per 100,000 for a health emergency<sup>1</sup>. It has been long identified that the following factors contribute to the high incidence of TB among mineworkers; high HIV prevalence, prolonged exposure to silica dust, poor living conditions, migration of mineworkers across borders, a poor cross-border health referral system and high poverty levels in peri-mining communities.

It has been reported by the World Bank that each year about half a million men travel across the Southern African region to work in South Africa's mines. Mineworkers are exposed to dust hazards in the working environment, which may contain silica and with prolonged exposure leading to silicosis. Silicosis is a disease, where very fine and invisible crystalline silica dust causes irreversible damage to lung health tissue. The resulting scarring of tissue reduces the ventilation capacity of the lung and leads to shortness of breath and eventually to the premature death of the person with the disease. The compromised lung increases the susceptibility to TB. It may take ten to twenty years before the disease affects the quality of life. Very often the person with the disease does not associate their illness with their premorbid working environments and conditions any more. The World Bank estimates that two million ex-mineworkers live in South Africa and the neighbouring labour-sending countries of Botswana, Lesotho, Swaziland and Mozambique. It is assumed that many of these ex-mineworkers suffer from silicosis with a higher likelihood of contracting tuberculosis.

Mineworker silicosis persists worldwide even though there

is documented information of its cause and methods for controlling it. It is considered a preventable disease today, when appropriate measures are applied in the workplace. WHO, in its Global Programme on the Elimination of Silicosis, points out: "Today, society possesses all the necessary means to combat this preventable disease and there is no excuse for silicosis persistence throughout the world. In the absence of effective specific treatment of silicosis, the only approach towards the protection of workers' health is the control of exposure to silica-containing dusts"<sup>2</sup>.

As outlined in Article 12 of the Charter of Fundamental Rights in SADC; every worker in the region has the right to health and safety at work and to a healthy and safe environment that sustains human development and access to adequate shelter. The article emphasises the importance of International Labour Organisation (ILO) Convention No. 155 and addresses workers' rights to services that provide for the prevention, detection of and compensation for work-related illness or injury, including emergency care, with rehabilitation and reasonable job security after injury and adequate inflation adjusted compensation.

Mining plays a significant role in the development process of the South African Development Community (SADC) by creating wealth and employment and a market for other industries such as manufacturing and the service industry.

Recognising that a thriving mining sector can contribute to economic development, alleviation of poverty and an improved standard and quality of life throughout the region, member states of SADC have signed a Protocol on Mining agreeing to adopt internationally accepted regional standards within the mining sector (Enforced 10/02/2000)<sup>3</sup>. The Protocol outlines that signatories "agree to cooperate in improving the practices and standards of occupational health and safety in the region's mining sector." Given the latter and acknowledging the gravity of the TB crisis in the mining sectors, in 2012, the SADC Heads of State signed the "Declaration on TB in the mining sector". The declaration states that mineworkers in the SADC region have contributed significantly to the wealth of the region at

<sup>1</sup> The World Bank (2016): Fighting TB among Southern Africa mineworkers.

Online: <http://www.worldbank.org/en/news/feature/2016/02/26/fighting-tb-among-southern-africa-mine-workers>.

<sup>2</sup> Fedotov, I (2003): The ILO/WHO Global Programme on Elimination of Silicosis. GOHNET Issue No. 5.

<sup>3</sup> SADC (1997): Protocol on Mining in the SADC. Online <http://www.sadc.int/documents-publications/show/808>



great personal cost to their health and welfare and that given the fact that the mining sector is one of the hardest TB-hit sectors, immediate action is needed to protect mineworkers from occupational lung diseases and suffering. In the declaration the Heads of States commit to providing appropriate legislation and a regulatory authority and public health resources to protect miners in Southern Africa from the threat of TB and other occupational diseases<sup>4</sup> and by signing are open to audit by the international community.

Several significant achievements have been made in the combined effort to tackle TB in the mining sector; however, more needs to be done to control dust-hazards in the workplace and reduce the incidence of dust related lung diseases, such as silicosis and TB.

A review of the legislation around the prevention and control of occupational lung diseases in mining in 10 SADC countries shows that there is little harmonization where occupational hygiene standards and practices are concerned, which includes the control of hazardous dusts and hence the prevention of silicosis in the work place<sup>5</sup>.

Legislative frameworks clearly place the responsibility for maintaining the health and welfare of mineworkers on the mine owner. However, and apart from South Africa, with a comprehensive 'National Programme for the Elimination of Silicosis', the regulatory frameworks in place refer to

the importance of dust control and provide regulations for certain aspects of it, but do not prescribe standards and a holistic approach on how the regulations are to be implemented and controlled. There is recognition of the gaps and shortcomings across the concerned Ministries, across the mining industry and across concerned civil society actors, such as unions, miner's associations, etc. and there is a demand for support to improve national frameworks for occupational safety and health (OSH) in mining.

In 2016, ten countries (Botswana, Lesotho, Malawi, Mozambique, Namibia, South Africa, Swaziland, Tanzania, Zambia and Zimbabwe) were awarded a significant grant from the 'Global Fund to fight AIDS, Tuberculosis and Malaria' aimed at a combined effort to reduce TB in the mining sector in Southern Africa.

This toolkit was developed under the umbrella of the Global Fund grant. It was designed to respond to the diverse needs formulated by the mentioned stakeholders. It provides comprehensive information about dust control standards and dust control practices in the mining industry. It addresses four target audiences, who play a key role in eliminating dust related lung diseases in mining in Southern African countries, namely legislators and policy makers, OSH Inspectorates, mine operators and managers and their OSH officers as well as unions and civil society actors.

<sup>4</sup> [http://www.aeras.org/img/uploads/attachments/437/tb\\_and\\_mining\\_prioritize\\_randd\\_final.pdf](http://www.aeras.org/img/uploads/attachments/437/tb_and_mining_prioritize_randd_final.pdf).

<sup>5</sup> Botswana, Lesotho, Malawi, Mozambique, Namibia, South Africa, Swaziland, Tanzania, Zambia, Zimbabwe

# Objectives of the toolkit

---

The aim of this toolkit is to support countries embarking on the journey of reforming their occupational safety and health (OSH) frameworks targeting the prevention of occupational lung diseases in mining, by providing them with material, resources and good practices informing this process.

**The more specific objectives aligned with this toolkit are as follows:**

- (1)** This toolkit provides the following benefits for policy makers:
  - a) Increases knowledge about occupational dust hazards in mining workplaces,
  - b) Provides state-of-the-art dust control programmes and standards,
  - c) Discusses good practices for improving or amending national regulatory dust control frameworks.
- (2)** This toolkit provides key resources to occupational safety and health inspectorates who are responsible for the mining sector with:
  - a) Knowledge about dust hazards in mine work and its effects on mineworkers' health,
  - b) State-of-the-art dust control frameworks,
  - c) Measures and tools for inspecting mining operations for compliance.
- (3)** This toolkit provides mine operators or managers with the knowledge on why and how to set up mine-specific dust control programmes; including tools facilitating these tasks.
- (4)** This toolkit provides civil society organisations representing or working with mineworkers with knowledge about the importance of dust control in the mining work place and with promotional material that can be shared with mineworkers during health educational sessions.

## Target audiences of this toolkit

---

As mentioned earlier, this toolkit was designed as a response to the manifold information needs of stakeholders in occupational safety and health programmes targeting the mining sector in Southern Africa. It particularly addresses four broad stakeholder groups:

- (1)** Policy makers responsible for the development of occupational safety and health policies addressing (among others) the mining sector or tasked with the reform of (mine) occupational safety and health legislation to international and regional minimum standards.
- (2)** Inspectorates responsible for enforcing occupational safety and health standards in the mining sector, which could include Labour Inspectorates, Mine Safety Inspectorates and well as Public Health Inspectorates.
- (3)** Mine operators or mine managers as well as their occupational safety and health officers (or occupational hygienists) tasked with developing and implementing occupational safety and health policies and dust management programmes at the mine.
- (4)** Members of civil society organisations representing and/or working with mineworkers (mineworker unions and mineworker associations), but also members of health and safety committees in mines, union health and safety representatives and union educators.



# HOW TO USE THIS TOOLKIT

---

## Structure of the toolkit

**The toolkit has been divided into two parts:**

The first part (A) is an introduction to the toolkit, giving an overview on rationale, objectives and target groups. This includes the present section on how to use the toolkit, introducing the structure and the contents displayed under different modules.

The second part (B) presents the actual contents and tools for improving dust control in the mining sector. The contents are organised in modules, each aimed at different target audiences.

**Modules 1 – 4 contain the following sub-sections:**

### Introduction

The introduction to each module provides the user with a short rationale, the purpose and objectives of the module.

### Background reading

The background reading section of each module provides the user with information and updates on state of the art dust control programmes in mining. The section is customized to the information needs of the different target audiences.

### Tools

The tools section contains a collection of useful tools and instruments derived from good practice models applied elsewhere in the mining sector in Southern Africa. The tools may serve as a resource and orientation; they may be adapted to the needs of the respective audience/user or may simply be reproduced and introduced.

**Module 5 differs from modules 1 – 4, containing so-called toolbox talks. Toolbox talks are briefs for all users of the toolkit wanting to make a presentation on key themes in dust control in the mining sector.**



The toolkit was primarily designed for the use of key stakeholders in countries wanting to introduce comprehensive 'national dust control programmes', providing them with orientation, background information and resources for programme implementation.

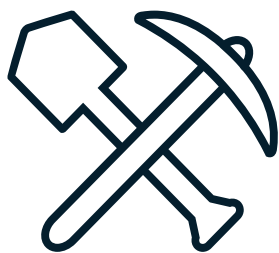
The toolkit provides practical and concrete tools and suggestions for the latter. Selected elements such as checklists and manuals and the safety and health education material on dust hazards and related occupational diseases can also be adapted to existing policies, practices and programme to improve dust hazard control and prevention of occupational lung disease.

Users may process the information in this toolkit (print and CD-rom); or, make use of the 'TB in the mining Sector in Southern Africa (TIMS)' website and download information directly from <https://www.timssa.co.za>. All information may be reproduced but acknowledgement must be given to the Global Fund and Wits Health Consortium.



## SYMBOLS USED IN THIS TOOLKIT

---



Introduction to Toolkit



Resource for Policy Makers



Resource for Inspectorates



Resource for Mine  
Management



Resource for Unions,  
Civil Society Organisations  
and Associations



Toolbox Talks

# GLOSSARY OF TERMS AND DEFINITIONS

<b>Artisanal small scale mining (ASM)</b>	Covers both artisanal and small-scale mining. The term ASM is used in a broad sense to refer to all kinds of local mining activity that larger companies could encounter (World Bank)
<b>Asbestosis</b>	All types of asbestos cause lung cancer, mesothelioma, cancer of the larynx and ovary, and asbestosis (fibrosis of the lungs). Exposure to asbestos occurs through inhalation of fibres in air in the working environment, ambient air in the vicinity of point sources such as factories handling asbestos, or indoor air in housing and buildings containing friable (crumbly) asbestos materials (World Health Organisation)
<b>Coal workers' pneumoconiosis</b>	Coal Workers' Pneumoconiosis (CWP), commonly called Black Lung, is type of pneumoconiosis caused by inhaling respirable coal mine dust (National Institute of Occupational Safety and Health)
<b>Code of practice</b>	A code of practice that has been drawn up providing guidance to those who may be engaged in the framing of provisions and the setting up of systems, procedures and arrangements for the recording and notification of occupational accidents and diseases, commuting accidents, dangerous occurrences and incidents, and their investigation and prevention (International Labour Organisation)
<b>Engineering controls</b>	Engineering controls protect workers by removing hazardous conditions or by placing a barrier between the worker and the hazard. Examples include local exhaust ventilation to capture and remove airborne emissions or machine guards to shield the worker (National Institute of Occupational Safety and Health)
<b>Hazard</b>	A danger or risk (International Labour Organisation)
<b>Hierarchy of controls</b>	A hierarchy of controls in the context of this toolkit refers to feasible and effective control solutions for dust hazards in the work place. The elements of this hierarchy encompass elimination of dust, substitution, engineering controls, administrative controls and last ranging the use of personal protective equipment (National Institute of Occupational Safety and Health)
<b>Homogenous exposure group (HEG)</b>	Refers to a group of employees with similar exposures to hazards and monitoring exposures of the sub group can provide useful data about the remaining group (South African Department of Labour)
<b>Large scale mine</b>	Different countries classify the size of the mine according to the number of staff employed, the size of the yield and the equipment/technology used to mine. In the context of this toolkit it refers to highly mechanized mining operations, mostly operated by transnational mining corporations.
<b>Medium scale mine</b>	Different countries classify the size of the mine according to the number of staff employed, the size of the yield and the equipment/technology used to mine
<b>Small scale mining</b>	There is no generally agreed definition of the term "small-scale mining", although it people employed or managerial structure (South African Department of Labour)

<b>Occupational exposure limit (OEL)</b>	Means the time weighted average concentration for an 8-hour work day and a 40-hour work week to which nearly all workers may be repeatedly exposed without adverse health effects (South African Department of Labour)
<b>Occupational health</b>	Occupational health deals with all aspects of health and safety in the workplace and has a strong focus on primary prevention of hazards. The health of the workers has several determinants, including risk factors at the workplace leading to cancers, accidents, musculoskeletal diseases, respiratory diseases, hearing loss, circulatory diseases, stress related disorders and communicable diseases and others (World Health Organisation)
<b>Occupational hygiene</b>	Means the anticipation, recognition, evaluation and control of conditions at a mine that may cause illness or adverse health effects to persons (South African Mine Health and Safety Council)
<b>Occupational disease</b>	An "occupational disease" is any disease contracted primarily as a result of an exposure to risk factors arising from work activity. "Work-related diseases" have multiple causes, where factors in the work environment may play a role, together with other risk factors, in the development of such diseases (World Health Organisation)
<b>Occupational medicine</b>	Means the prevention, diagnosis and treatment of illness, injury and adverse health effects associated with a particular type of work (South African Mine Health and Safety Council)
<b>Personal protective equipment (PPE)</b>	Personal Protective Equipment (PPE) provides additional protection to workers exposed to workplace hazards in conjunction with other facility controls and safety systems. PPE is considered to be a last resort that is above and beyond the other facility controls and provides the worker with an extra level of personal protection. (World Bank)
<b>Pneumoconiosis</b>	The pneumoconioses are a group of interstitial lung diseases caused by the inhalation of certain dusts and the lung tissue's reaction to the dust. The principal cause of the pneumoconioses is work-place exposure; environmental exposures have rarely given rise to these diseases. The primary pneumoconioses are asbestosis, silicosis, and coal workers' pneumoconiosis. As their names imply, they are caused by inhalation asbestos fibres, silica dust and coal mine dust (National Institute of Occupational Safety and Health)
<b>Respirable crystalline silica</b>	That portion of airborne crystalline silica that is capable of entering the gasexchange regions of the lungs if inhaled; by convention, a particle-size-selective
<b>Dust</b>	Fraction of the total airborne dust (National Institute of Occupational Safety and Health)
<b>Silicosis</b>	Silicosis is an incurable lung disease caused by inhalation of dust that contains free crystalline silica (International Labour Organisation)
<b>Tuberculosis (TB)</b>	TB is a contagious and potentially life-threatening infectious disease caused by a bacterium called Mycobacterium tuberculosis. People can breathe the infectious particles into their lungs and become infected. Infection usually requires prolonged sharing of airspace with a person actively spreading TB bacteria into the area. In rare cases, TB infection has been documented after short exposures to such persons with active TB. After becoming infected, most people's immune systems are able to contain the infection, but are not able to eliminate it without help from anti-TB drugs (National Institute of Occupational Safety and Health)



# LIST OF ABBREVIATIONS

<b>AIHI</b>	American Industrial Hygiene Association
<b>ASSM</b>	Artisanal and small scale mining
<b>BME</b>	Benefit Medical Examination
<b>COM</b>	Chamber of Mines
<b>COP</b>	Code of Practice
<b>CWP</b>	Coal Worker's Pneumoconiosis
<b>DMR</b>	Department of Mineral Resources
<b>HATS</b>	<i>HIV/AIDS Tuberculosis and Silicosis</i>
<b>HEG</b>	Homogenous Exposure Group
<b>HIV</b>	Human Immunodeficiency Virus
<b>IHRA</b>	Industrial Hygiene Risk Assessment
<b>ISO</b>	International Standardisation Organisation
<b>ILO</b>	International Labour Organisation
<b>MHSC</b>	Mine Health and Safety Council (South Africa)
<b>ODMWA</b>	Occupational Diseases in Mine Works Act (South Africa)
<b>OSHA</b>	Occupational Safety and Health Administration
<b>PPE</b>	Personal Protective Equipment
<b>REL</b>	Recommended Exposure Limit
<b>TB</b>	Tuberculosis
<b>TIMS</b>	TB in the Mining Sector in Southern Africa
<b>WHC</b>	Wits Health Consortium





## LIST OF TOOLS (CD)

---

### Module 1

Guideline for the compilation of a mandatory Code of Practice for an occupational health programme on personal exposure to airborne pollutants  
South African Mining Industry Best Practice on the Prevention of Silicosis

### Module 2

Mine inspector's checklist for mine visits  
NIOSH Sampling Method 7500  
OSHA Sampling Method ID 142

### Module 3

Advanced health risk assessment sheet  
Field sampling record – chemicals and dust  
Industrial hygiene statistical worksheet  
Monitoring and results form  
NIOSH sampling method 7500  
OSHA sampling method ID 142  
Sampling – Equipment and calibration register

### Module 4

Illustration for mineworkers on a formal mine  
Illustration for mineworkers on a small scale or artisanal small scale mine







## ACKNOWLEDGEMENTS

This toolkit would not have been successfully completed without the support and valuable participation of individuals from various governmental and non-governmental organisations who contributed to the development and finalisation of this document.

**Executive Editors:** Dr Gerlinde Reiprich and Alexander Kamadu

**Responsible for the content of the toolkit:** Lloyd Askham, Andre van Zyl, Dr Gerlinde Reiprich and Alexander Kamadu

**Design:** Digital Brandshop  
Johannesburg 2017

TB in the Mining Sector Southern African Programme (TIMS)

Wits Health Consortium (WHC) | 24 St Andrews | Parktown | Johannesburg 2193 | South Africa | [www.timssa.co.za](http://www.timssa.co.za)  
Key contributors: Health Focus | [www.health-focus.de](http://www.health-focus.de)