

HEALTH FOCUS



TB in the Mining Sector in Southern Africa (TIMS)

Service Package F: Prevention of TB in the mines

Consolidated Report: Review of existing legislation and regulations for mine health and safety in the ten countries



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GLOSSARY OF TERMS AND DEFINITIONS

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| Artisanal small scale mining (ASM) | 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) |
| Asbestosis | 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) |
| Code of Practice | 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) |
| Coal workers' pneumoconiosis | 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) |
| Engineering controls | 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) |
| Hazard | A danger or risk (International Labour Organisation) |
| Hierarchy of controls | 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) |
| Homogenous Exposure Group (HEG) | 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) |
| Large scale mine | 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. |
| Medium scale mine | 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 |
| Occupational disease | 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) |

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| Occupational exposure limit (OEL) | 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) |
| Occupational health | 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) |
| Occupational hygiene | 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) |
| Occupational medicine | 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) |
| Personal protective equipment (PPE) | 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) |
| Pneumoconiosis | 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) |
| Respirable crystalline silica dust | That portion of airborne crystalline silica that is capable of entering the gas exchange regions of the lungs if inhaled; by convention, a particle-size-selective fraction of the total airborne dust (National Institute of Occupational Safety and Health) |
| Silicosis | Silicosis is an incurable lung disease caused by inhalation of dust that contains free crystalline silica (International Labour Organisation) |
| Tuberculosis (TB) | 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

| | |
|-------------|---|
| ASSM | Artisanal and small scale mining |
| BME | Benefit Medical Examination |
| COM | Chamber of Mines |
| COP | Code of Practice |
| CWP | Coal Worker's Pneumoconiosis |
| HATS | HIV/AIDS Tuberculosis and Silicosis |
| HEG | Homogenous Exposure Group |
| HIV | Human Immunodeficiency Virus |
| IHRA | Industrial Hygiene Risk Assessment |
| ILO | International Labour Organisation |
| MHSC | Mine Health and Safety Council (South Africa) |
| OSHA | Occupational Safety and Health Administration |
| PHC | Primary health care |
| PPE | Personal Protective Equipment |
| REL | Recommended Exposure Limit |
| TB | Tuberculosis |
| TIMS | TB in the Mining Sector in Southern Africa |
| WHC | Wits Health Consortium |



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1. EXECUTIVE SUMMARY

1.1. Introduction and methodology

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 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 State commit to providing appropriate legislative and regulatory authority and public health resources to protect miners in Southern Africa from the threat of TB and other occupational diseases¹ and by signing are open to audit by the international community.

The Global Fund (GF) has awarded a 30 million US\$ grant to 10 of the SADC member states (namely Botswana, Lesotho, Malawi, Mozambique, Namibia, South Africa, Swaziland, Tanzania, Zambia and Zimbabwe) to improve and harmonise the application of and adherence to occupational health and safety standards and transform and scale up TB interventions in the Southern African mining sector.

To support the countries participating in the GF program effectively, Health Focus was commissioned to:

- a) review the existing legislation and regulations focussing on the health and safety of mineworkers, and
- b) recommend ways of strengthening these regulations to improve working conditions based on the latest evidence.

1.1.1 Methodological approach and reference framework

The review process encompassed a thorough desktop review of the legislative framework and qualitative data collection during in-country consultations with key informants within a tripartite arrangement (government, employers, organised labour) in the ten study countries, namely Botswana, Lesotho, Malawi, Mozambique, Namibia, Swaziland, South Africa, Zambia, Tanzania and Zimbabwe.



The review was structured as follows:

(a) Macro assessment of each country to build a national profile for mine health and safety

This included:

- A macro-economic assessment, including general socio-economic performance indicators and mining sector data (including mining labour market data).

A review of the policy and legal framework for occupational risk protection, particularly dust control in the mining sector based on international, regional and sub-regional conventions, frameworks and guidelines.

- Organisational and management framework for occupational health and safety in the general context and mine health and safety, including institutional mapping.

This entailed data on the following groups:

- departments of government involved in occupational health and safety and mine health and safety;
- employer groups,
- trade unions and ex-worker associations; and
- academic units and NGOs working in the field.
- Determining the organisation and management framework for other social protection funds e.g. compensation funds.

(b) Meso-assessment: Implementation status of occupational risk and occupational health surveillance systems in the countries and their reach and effectiveness, with emphasis on small scale and artisanal mining. In this report, small scale and artisanal mining refers to mining for which the mine owner has a mining licence. Different countries classify the licence based on the size of the yield, technology used and number of staff employed.

¹ Areas: Tuberculosis and Mining: The Need to Prioritize R&D. Online: http://www.aeras.org/img/uploads/attachments/437/tb_and_mining_prioritize_randd_final.pdf. Accessed 15.06.2016



(c) Micro-assessment: Application of occupational risk reduction regulations at an enterprise level.

A three-person team, including two international experts and one national expert, undertook the country visits (see also annex 1 country visit dates and team structure).

Data collection methods included the following:

- in-depth face-to-face and telephonic interviews with key informants;
- group interviews;
- observations of occupational health service provision, and
- mining health and safety system assessments during mine site visits

The findings and results of the review were tested and validated during a country stakeholder workshop conducted at the end of each country mission.

The following reference framework was utilized for the legislative review:

- The ILO conventions;
- SADC Charter of Fundamental Rights;
- WHO Programme on the Elimination of Silicosis and
- The Global Post-2015 End TB Strategy with its three pillars;
 - i. Bold and supportive systems,
 - ii. Integrated patient-centred care and prevention; as well as
 - iii. Research and innovation

Occupational health service provision has been evaluated against the Basic Occupational Health Service Model (BOHS)' as presented in figure 1.

Table 1: Reference framework

| End TB Strategy Pillars* | International frameworks, standards/models supporting the end-TB pillars in the world of (mine) work | Translation into action in the mining sector |
|--|--|---|
| <p>Pillar 1 – Integrated, patient-centred care and prevention</p> | <p>Application of Basic Occupational Health Services (BOHS) model² in the mining industry, including regular screening of mineworkers for occupational diseases and provision of primary health care services.</p> | <p>Patient-centred care and prevention:</p> <ul style="list-style-type: none"> Prevention of exposures to harmful working environments (heat, noise, humidity, dusts – occupational hygiene systems); Regular screening of mineworkers and ex-mineworkers for occupational lung diseases including TB; Provision of primary healthcare, including TB treatment and care, either on mining sites or within the public healthcare system after referral. |
| <p>Pillar 2 – Bold policies and supportive systems</p> | <p>Universal health coverage</p> <p>Occupational health and safety systems based on ILO conventions with effect on the mining sector: ILO Convention No.³</p> <ul style="list-style-type: none"> C155, (1981) on Occupational Safety and Health (OSH); C161 (1983) on Occupational Health Services (OHS); C171 (1985) Occupational Health Services Recommendation; C187 (2006) Promotional Framework for Occupational Safety and Health. | <p>Legislation, policies and regulations geared towards</p> <ul style="list-style-type: none"> Mine health and safety with emphasis on occupational hygiene regulations (mining sector) geared towards the prevention of pneumoconiosis and tuberculosis, with emphasis on dust control (occupational exposure limits (OELs) and controls); Prevention of occupational diseases; National surveillance of occupational diseases; Treatment and care of occupational diseases; TB clearly integrated as an occupational and compensable disease where there is significant exposure to silica at work. |
| | <p>Social protection</p> <ul style="list-style-type: none"> ILO Convention C159 Vocational rehabilitation and employment (disabled persons convention, 1983 (No. 159); ILO Conventions C017 and C018 as well as C018’s revised version C042 Compensation of Occupational Injuries (C017) and Diseases (C018/042). | <p>Legislation, policies and regulations - occupational health and safety – and their application:</p> <ul style="list-style-type: none"> Compensation of non-curable occupational diseases and conditions affecting mine workers and ex-mineworkers; TB clearly integrated as an occupational and compensable disease in mine work where there is significant exposure to silica; Provisions made for functional and vocational rehabilitation following an occupational injury or disease. |
| | <p>Political commitment</p> <ul style="list-style-type: none"> C176 on Safety and Health in Mines; ILO/WHO Global Programme for the Elimination of Silicosis (GPES). | <p>Legislation, policies and regulations and their application:</p> <p>Mine health and safety with emphasis on occupational hygiene (mining sector) geared towards the prevention of pneumoconiosis and tuberculosis, with emphasis on dust control (occupational exposure limits and controls)</p> |
| <p>Pillar 3 – Intensified research and innovation</p> | <p>Mine) Workers’ health surveillance (based on ILO Technical and ethical guidelines for worker’s health surveillance⁴</p> <ul style="list-style-type: none"> Assessments of workers’ health; Biological tests and other investigations; Sickness monitoring; Recording and notification systems; Surveys, voluntary programmes and inspections. | <p>Availability of</p> <ul style="list-style-type: none"> Baseline information on TB incidence in the mining sector; Baseline information on silica exposures in the mining sector; Baseline information on silicosis incidence and prevalence in the mining sector; Surveillance and monitoring systems for TB and occupational diseases/injuries. |

² Rantanen J. (2005): Basic Occupational Health Services. A WHO/ILO/ICOH 2nd revised edition. 2 April 2005, Finnish Institute of Occupational Health, Helsinki.

³ See annex one: Overview of most relevant ILO conventions

⁴ International Labour Office Geneva (1998): Technical and ethical guidelines for workers’ health surveillance. Occupational safety and health series No.72. ISBN 92-2-110828-7

1.2. Findings and Conclusions

1.2.1. Harmonization of regional legislative frameworks

The ratification status of ILO conventions (see table 6) suggests that there is little harmonization in the field of labour laws. ILO Convention C155, which is highlighted in Article 12 of the Charter of Fundamental Rights in SADC has only been ratified by South Africa, Zambia and Lesotho so far. The review of actual legislative frameworks in countries shows that many principles and recommendations contained in the relevant conventions have been incorporated into national legislation. SADC member states need to follow up with their commitments if they want to build flourishing communities. Likewise, the SADC secretariat should undertake efforts to execute its plans, such as the “Harmonisation Implementation Plan” which was adopted in 2009 within the framework “Harmonisation of Mining Policies, Standards, Legislative and Regulatory Framework in Southern Africa”.

1.2.2. National legislative frameworks for OHS in the mining sector

The legislative review shows that all study countries have put legislation in place addressing occupational health and safety in the workplace, which would in theory protect mineworker’s from dust-related occupational diseases. The legal frameworks clearly place the responsibility for maintaining the health and welfare of mineworkers on the mine owner.

Apart from South Africa and Mozambique, the provisions for occupational safety and health in the mining sector, and particularly regulations concerning dust control in the work environment, are very general and leave room for interpretation.

Occupational safety and health matters are usually addressed in both, labour and mining laws / regulations of study countries.

South Africa alone provides the mining industry with clear regulations and guidelines on how occupational hygiene systems need to be designed and controlled. It is the only country that has a documented process/commitment on achieving zero harm in the mining industry. South Africa implements a ‘National Programme for the Elimination of Silicosis’. Within this context mining houses are required to establish and implement a ‘Mandatory code of practice (CoP) for an occupational health programme on personal exposure to airborne pollutants’⁵.



The most comprehensive legislative framework (apart from South Africa) exists in Mozambique, however clear implementation guidelines and control systems are not in place.

All other study countries refer to the importance of dust control in their legislation and provide regulations for certain aspects of dust control, such as ventilation or wetting of surfaces, personal protective equipment (PPE) etc., but do not prescribe a holistic approach to it. As in Mozambique the legislation remains silent on how the regulations are to be implemented and controlled.

South Africa, Tanzania, Namibia, Mozambique and Zambia have adopted occupational exposure limits for crystalline silica dust (and other airborne pollutants, e.g. asbestos). There are however (apart from South Africa) no guidelines or protocols on how dust monitoring and measurements should be conducted (e.g., spot sampling versus gravimetric sampling; specifications of the related equipment, etc.).

All countries, with the exception of Malawi and Lesotho, prescribe occupational health surveillance in terms of fitness to work examinations and periodic medical examinations either in the labour laws or in the mine safety laws and regulations (or both). Occupational diseases are either defined in the labour, compensation or public health laws. Pneumoconiosis is considered a reportable and compensable occupational disease in all countries. Tuberculosis is only compensable in South Africa and Zambia for mine workers exposed to silica dust.

⁵ Guideline DME Reference Number “Department of Minerals and Energy Ref. No 16/3/2/4-A1” issued by the Chief Inspector of Mines. Effective date – 28 February 2003

1.2.3. Enforcement of legislative frameworks for OHS in the mining sector

Although there are clear gaps in the legislation or a lack of specific regulations, the legislative frameworks of all countries make provisions for the prevention of dust-related diseases in the mining sector. The frameworks clearly place the responsibility for maintaining the health and welfare of mineworkers on the mine owner. Effective enforcement of these regulations thus requires strong control and enforcement systems. Country assessments show that the inspectorates of labour, mining and health are not sufficiently capacitated to play that role, with the exception of the South African Department of Mineral Resources and to an extent the Ministry of Health in Zambia.

Most labour, health and mining inspectorates are understaffed, under resourced and do not have the necessary skills or systems to enforce the existing legislation. While extension and privatisation of the mining sectors in SADC has contributed to growth, new employment and national GDP, the control and enforcement systems have not been adapted to this new landscape of mine ownership. The Auditor Generals in Zambia and Tanzania have performed audits of the country's occupational health and safety systems and come to similar conclusions^{6,7}.

Interestingly the socio-economic status of a country does not predict its capacity to develop, monitor, and particularly to enforce legislation, be it in the field of occupational health and safety or in the field of mine safety. It was noticed that Inspectorates with strong leadership performed better and had a clear notion of occupational safety and health.

Most inspectorates operate without any site visit fees within their departmental budgets, which limits institutional development and coverage.

The prevention of occupational (lung) diseases in the mining sector is regulated either in the general labour laws or in specific mine health and safety laws of a country. Certain provisions are also laid down in public health laws. This makes law enforcement rather complex. Labour, health and mine safety inspectors share a joint responsibility for overseeing the occupational health and safety of the mining workforce but there is little or no coordination between Ministries. The stakeholder validation workshops performed at the end of country missions were often the first opportunity for representatives of the three ministries to share their concerns and challenges. Due to their limited capacity, most inspectorates concentrate on inspections of larger mines, where occupational hygiene standards are already in place and sound occupational health and safety policies are applied as regulated.

The artisanal mining segment is not inspected at all mostly due to:

- shortages in human resources and budgetary constraints;
- a lack of concepts on how to address the manifold safety and health challenges in this segment.

There are also other factors that explain the hesitance to control this sector more vigorously. Small scale and artisanal mining generates income to communities in mineral-rich areas. Communities and the local authorities are therefore rather protective of the practice or involved in it themselves. Inspections, not to mention the closing of mines, could stir resistance and political complications.

1.2.4. Application of OHS legislation in the mining sector

Although there are clearly shortcomings in the definition of occupational hygiene standards in the legislation (apart from South Africa), the larger multinational mining houses work towards internally set and internationally aligned occupational hygiene standards, including clear occupational exposure limits (OELs) for harmful dusts. The large-scale mining industry is also moving from human resource intensive mining to more automated processes, which facilitates the protection of workforces from occupational hazards such as dust, noise and heat. The most sophisticated occupational health and hygiene systems within the industry are found in South Africa and Namibia; with their long tradition in mining and Chambers of Mines taking charge of setting standards and disseminating good practice within the industry.

There is great variation on how OSH legislation is applied in medium-scale mines; being mostly dependent on the ownership and the profitability of the mining operation. Due to the weak inspection systems in place and a lack of authority of inspectors, sub-standard mining operations remain/become non-compliant.

The most problematic areas are small scale and artisanal small-scale mines. Although the owners of these enterprises hold a valid mining license, they tend not to apply the existing mine health and safety regulations and standards issued by mining, health or labour authorities.

In small scale mining, there are deficiencies in risk assessments, limited access to technical expertise and equipment to conduct hazard monitoring, and deficient management systems leading to the inability to comply with current health and safety standards⁸.



⁶ United Republic of Tanzania National Audit Office (2013): A performance report on the management of occupational health and safety in Tanzania.

⁷ Office of the Auditor General Zambia (2015): Report of the Auditor General on the management of occupational safety and health.

⁸ Marriott, A (2008): Extending health and safety protection to informal workers: an analysis of small-scale mining in KwaZulu-Natal. Research Report No. 76



Apart from South Africa, the Unions have not sufficiently picked up on health and safety matters of their members but rather more concerned with other labour issues such as wages, outsourcing of mine work, retrenchments etc. Even the mineworkers themselves are more concerned about their income than health; being mostly young and healthy when signing up with the industry.

1.2.5. Occupational health service coverage for mine workers

Zambia and Tanzania are the only countries where occupational health screening is performed by the public sector. In Zambia, the Occupational Health Institute in Kitwe performs all medical screening examinations on mine workers. The Occupational Safety and Health Authority performs occupational health screening in Tanzania; either with their own staff or through contracted medical practitioners. In all other countries, occupational health screening is performed in medical facilities on mining sites or contracted out to occupational health service providers by the mining houses.

Mineworkers employed in large and medium-scale mining operations are rather well protected in terms of occupational health and safety. Particularly, large-scale mining houses provide excellent, mostly above country-standard PHC, emergency and occupational health surveillance services combined with health promotion, prevention and well-being programmed (BOHS III/IV). The actions of international mining corporations are globally observed and pursuing certifications such as ISO 14000 (environmental certification), SA 8000 (working conditions certification) OHSAS 18000/1, and AA 1000 (accountability certification), influence the way health, safety and environment systems are designed and managed.

More challenges are found in medium-scale mining, depending on the size of the operation and the operator. Service provision reaches from BOHS stages I/II to mines without any adequate health and safety system in place. Clearly, the limited implementation of regular health and safety inspections and the enforcement of existing laws and regulations, contribute to the non-compliance of many workplaces in this mining segment.

The most underserved mineworkers are those of small-scale or artisanal mines. Although the owners of these enterprises mostly hold a valid mining license, they tend not to apply the OHS regulations and standards issued by mining, health or labour authorities. In none of the visited countries had the mineworkers of small-scale and artisanal mines visited undergone any pre-employment health check, let alone periodic examinations as stipulated by law. In all visited small-scale and artisanal mines, the mine managers were former mineworkers of larger mining operations in the country or from abroad and had participated themselves in occupational health surveillance programs offered either by the government or the mines.

The limited availability of occupational health services near small-scale and artisanal mining areas, financial access barriers and the low degree of risk awareness contribute to low uptake of services by this mining population. In the middle-income study countries, the availability and accessibility of public health services is much better than in the lower income countries, so there is at least certain coverage with general health services. The capacity of these de-centralized public services to diagnose occupational diseases is however very limited or non-existent.

1.2.6 Social protection of diseased mineworkers

All study countries have established compensation systems, which are either based on employer liability or are integrated into social protection schemes. Occupational lung diseases, and particularly the various forms of pneumoconiosis, are compensable in all study countries. Tuberculosis is compensable in South Africa and Zambia, if mine workers are exposed to silica dust at work, for defined periods. In other countries, Tuberculosis, is compensable when diagnosed with pneumoconiosis or more specifically, silicosis. However, research strongly suggests that exposure to significant levels of silica dust in high HIV prevalence settings, substantially increases the risk of developing active pulmonary tuberculosis. This supports the suggestion to integrate tuberculosis as a compensable disease when significant respirable crystalline silica exposure is confirmed.

The compensation systems cater theoretically for current and ex-mineworkers, as well as for their dependents. However, in each of the countries the systems face constraints in implementing a proper compensation process. While the compensation of claims from work-related injuries is a relatively straightforward process, the compensation of occupational diseases evolving over time and mostly long after formal employment, poses a great challenge. All countries face challenges in the compensation of ex-mineworkers. Apart from Zambia and South Africa, there are no systems in place to conduct regular medical benefit examinations for ex-mineworkers. But even in these two countries, many mineworkers having retired back to their rural homes, are lost to follow up. There are no systems in place to systematically track and trace ex-mineworkers and encourage their participation in medical screening. South Africa, having the most fragmented system, where a separate Act (ODMWA) regulates the compensation of occupational lung diseases in mineworkers, is currently developing an integrated database containing current and ex-mineworker information. It is expected that this database will allow for the physical tracing of ex-mineworkers and the upload of medical information obtained during mine work to facilitate compensation.

Mineworkers in small-scale or artisanal mining are not registered and do not contribute to compensation funds and are thus not eligible for compensation of work-related injuries or diseases. In countries like Tanzania, Mozambique and Zimbabwe, with huge artisanal mineworker populations, this will pose a burden on the public health and social security systems, when mineworkers are injured or fall sick and are left without social protection of any kind.

In order to integrate artisanal mine work into social security systems, mutual health insurance approaches should be considered to support mineworkers and families after loss of income through mine work.

1.2.7. Research and innovation

Occupational health surveillance and studies

In South Africa and Zambia, occupational medical surveillance systems in the mining sectors provide relative data on occupational diseases and conditions and statistics provide some information to guide policy and strategy development.

In all other countries, occupational health surveillance statistics cannot be relied upon because health screening of mineworkers is not standardised and performed across the whole spectrum of mines in the industry.

Reporting of occupational injuries and diseases is prescribed in the legislation of all countries. However, occupational disease statistics derived from reporting are unreliable sources of information. Reporting mechanisms are unclear, there is confusion about how and to whom to report and reporting requirements are not adhered to. The competent authorities do not enforce occupational disease reporting. Databases at inspectorates are often paper based, contain incomplete information and are not processed into meaningful statistics and annual reports. Respectively, baseline information on the burden of occupational (lung) diseases in the mining sectors is not readily available.

Since pneumoconiosis develops with long latency and the ex-mineworker community is not screened systematically, there are further gaps in information. Medical practitioners and service providers are unfamiliar with occupational diseases and their reporting requirements. The same applies for artisanal small-scale workforces who are only able to access public health systems.

Research on occupational diseases is done sporadically, often in the context of University programs or development projects. These research findings are not processed further or used to inform policy development. Authorities are rarely aware of these studies.



A systematic approach to research is found in South Africa, where the National Institute of Occupational Health provides oversight into occupational health concerns across the country and sectors. In addition, the Occupational Health and Safety Institute in Kitwe produces and publishes research reports, but does not follow a laid-out research agenda.

Dust emissions and country risk profiles

Whilst in South Africa, the mining industry must report on hazardous dust types and emissions to the Department of Mineral Resources, baseline data on types of dust and dust emissions are not available from the Ministries of Mines in all other study countries. The mining industry (particularly large-scale mines) does however keep such data, but these mines do not commonly share this with the authorities or even within the industry.

Given the scarce resources of inspectorates, the collection of baseline data, and the subsequent development of risk profiles, could help focus inspection plans on high risk areas.

Innovation

During country visits several innovative approaches for occupational hygiene knowledge management and dissemination within the mining industry have been observed.

- Namibia has established a quarterly peer review mechanism where the Chamber of Mines Safety Committee, the Unions, the Chief Inspector of Mines and mining industry technicians jointly inspect and discuss mine safety systems in a mine.
- The South African Chamber of Mines has established the Mine Occupational Safety and Health Learning Hub (MOSH) sharing and adopting leading practice in the mining industry.

The Zambia Chamber of Mines has established a Mining Sector Education Trust (ZAMSET), which supports skills development in the mining industry. This provides an opportunity for integration of occupational hygiene into curricula and courses.

These models can be shared as good practice and implemented elsewhere in study countries.

1.3. Recommendations

1.3.1. General recommendations

The following recommendations were derived from findings and conclusions within this report:

(1) It is recommended that countries which have not yet adopted ILO convention C155, as agreed upon in Article 12 of the Charter of Fundamental Rights in SADC, proceed with the adoption process and align their legislative frameworks to that Convention (Botswana, Malawi, Mozambique, Namibia, Swaziland, Tanzania, Zimbabwe).

(2) It is further recommended that SADC promotes the implementation of the ‘SADC Declaration on Mining’ and particularly the “**Harmonization of Mining Policies, Standards, Legislative and Regulatory Framework in Southern Africa**” adopted in 2006, and in the field of safety, health and environment agree on a joint approach to the elimination of silicosis and Tuberculosis in the mining sector and provide common standards or codes of practice containing

- aligned occupational hazard exposure limits for airborne pollutants;
- aligned occupational hygiene protocols for the management and control of dust in the workplace, particularly personal dust monitoring approaches and the systematic recording of lifetime exposures of mineworkers.

(3) It is recommended that all countries (apart from South Africa which already has such legislation) develop regulations or introduce mandatory codes of practice geared towards the elimination of exposures to hazardous air pollutants.

(4) It is recommended that Lesotho and Malawi clearly introduce occupational medical surveillance into their legislation based on ILO Recommendation No. 171, 1985, including occupational medical screening of ex-mineworkers.

(5) It is recommended that Swaziland and Zimbabwe amend their legislation and cater for exit medical examinations and regular occupational medical screening of ex-mineworkers and Botswana introduces regular screening of current and ex-mineworkers.

(6) It is recommended that all countries (apart from South Africa) build the capacity of their labour and mine safety inspectorates (adequate human resources, equipment, skills and budgets) to effect meaningful controls and enforce set standards.

(7) It is recommended that guidelines be developed to support quality inspections of dust control systems in mines.

(8) It is recommended that where inspectorates lack the technical expertise to conduct occupational hygiene inspections, that these services be contracted out to competent service providers.

(9) It is recommended that, given the current budgetary and human resources constraints, inspectorates develop inspection plans focusing on mining operations that pose greatest risk to the safety and health of the workforces (medium, small and artisanal mining).

(10) It is recommended that the Chambers of Mines and other Mining Associations adopt an active role in guiding and supervising their member’s compliance with the current legislation in their respective countries.

(11) It is recommended that the Mineworker Unions place greater importance on safety and health of their members and participate actively in tripartite bodies promoting state of the art occupational safety and health standards which should then be applied within the mining industry.

(13) Tuberculosis should be recognised as a compensable disease in countries where this is not yet the case. However, compensation should only be provided for when a mineworker has been exposed to significant levels of respirable dust during work life. Respective definitions must be elaborated. South Africa (ODMWA) requires exposure to a minimum of 200 “risk” shifts in order for Tuberculosis to be considered compensable - but a longer period is required in South African workers in general industry (2 years in COIDA). Clearly, work needs to be done to arrive at a level of silica dust exposure that increases the risk of TB.



14) It is recommended that countries develop policies, legislation and approaches to track and trace ex-mineworkers and offer medical benefit examinations for occupational diseases.

(15) Ideally, medical benefit examinations should be included into de-centralised occupational health services, which could also facilitate the access to occupational medical services of ex-mineworkers and mineworkers in small-scale or artisanal mines.

(16) To integrate artisanal mine work into social security systems, mutual health insurance approaches should be considered so that there is support for mineworkers and families in the event of loss of income through mine work.

(17) Conduct research on true burden of pneumoconiosis and tuberculosis in study countries.

(18) The relevant Ministries must develop robust occupational health surveillance systems with integrated electronic databases.

(19) Conduct baseline studies on types of dusts and dust emissions in the mining sectors of study countries.

(20) Adoption of models for industry-wide learning mechanisms as implemented in SA, Namibia and Zambia.

1.3.2. Key intervention recommendations

The findings of this legislative review lead to the following key conclusions and recommendations:

Conclusion I: With exception to South Africa; the laws, regulations and implementation guidelines in the study countries (targeting meaningful dust control and the prevention of occupation lung diseases in the mining sector) are imprecise, fragmented, out-dated and do not provide for a hierarchy of controls to be established in mining operations. Baseline knowledge about silica dust emissions and high and low-risk areas for occupational lung diseases are not available and cannot guide the development of risk profiles and respective risk reduction programs.

Intervention recommendation I: Provision of technical assistance to Ministries of Mines/Mineral Resources for the development of national dust control programs:

Technical support to be provided in order to conduct baseline research on silica dust emissions and risk profiling in mining-intensive countries (Tanzania, Mozambique, Zimbabwe, Namibia and Botswana) where reliable statistics are not available.

Research to be conducted on the true burden of pneumoconiosis and tuberculosis amongst current and particularly ex-mineworkers in mining-intensive countries (Tanzania, Mozambique, Zimbabwe, Namibia and Botswana) where reliable statistics are not available.

Technical support for the development of a mandatory code of practice on personal exposure to airborne pollutants to be applied by the mining industries.

Capacity development (knowledge, skills and equipment) of the relevant inspectorates to supervise and inspect the implementation of the CoP in the mining industry.

Technical support and facilitation of a roll-out campaign for the introduction of the CoP in collaboration with the Chambers of Mines, other mining associations and the relevant Unions.

Conclusion II: Artisanal small-scale mining provides employment and income to thousands of mineworkers, but there is no awareness about the most basic safety and health matters that provide minimum protection to employees. The relevant Ministries lack concepts and approaches on how to address safety and health concerns within this mining segment and the push for better protection of the workforces.

Intervention recommendation II: Provision of technical assistance to Ministries of Mines/Mineral resources and/or Labour to develop and apply occupational safety and health concepts for artisanal small-scale mining operations, particularly in Tanzania, Mozambique and Zimbabwe.

Technical support to the relevant Ministries in developing risk awareness and risk protection concepts for artisanal small-scale miners. Capacity building of inspectorates and small-scale mining associations to conduct risk awareness and risk protection training with artisanal small-scale miners and within peri-mining communities. Roll-out of risk awareness and risk protection training in selected high-risk areas.



2. INTRODUCTION AND FRAMEWORK

2.1. Study objectives and tasks

Mining plays a significant role in the development process of the South African Development Community (SADC) by creating wealth, employment and a market for other industries such as manufacturing and the services industry. SADC member countries include Angola, Botswana, Democratic Republic of Congo, Lesotho, Madagascar, Malawi, Mauritius, Mozambique, Namibia, Seychelles, South Africa, Swaziland, United Republic of Tanzania, Zambia, and Zimbabwe.

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)⁹. 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.”

Mineworkers in sub-Saharan Africa have greater incidence of TB than do any other working population in the world. In South Africa, the TB incidence rate is as high as 2,500-3,000 per 100,000 mineworkers, which is 10 times the emergency threshold set by WHO¹⁰.

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 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 State commit to protecting miners in Southern Africa from the threat of TB and other occupational diseases¹¹ by providing appropriate legislative and regulatory authority, and public health resources. In addition, by signing this protocol, the Heads of State are open to audit by the international community.

The Global Fund (GF) has awarded a 30 million US\$ grant to 10 of the SADC member states (namely Botswana, Lesotho, Malawi, Mozambique, Namibia, South Africa, Swaziland, Tanzania, Zambia and Zimbabwe) to;

- (a) improve and harmonise the application of and adherence to occupational health and safety standards, and
- (b) transform and scale up TB interventions in the Southern African mining sector.

To support the countries participating in the GF program effectively, Health Focus was commissioned to review the existing legislation and regulations focussing on the health and safety of mineworkers and recommending ways of strengthening these regulations to improve working conditions based on the latest evidence.

⁹ SADC (1997): Protocol on Mining in the SADC. Online <http://www.sadc.int/documents-publications/show/808>. Accessed 15.12.2015

¹⁰ Stuckler et al (2011): Mining and Risk of Tuberculosis. *Am J Public Health*. 2011 March; 101(3): 524–530. doi: 10.2105/AJPH.2009.175646

¹¹ Stuckler et al (2011): Mining and Risk of Tuberculosis. *Am J Public Health*. 2011 March; 101(3): 524–530. doi: 10.2105/AJPH.2009.175646



2.2. Methodology

2.2.1. Methodological approach

The review process encompassed a thorough desktop review of the legislative framework and qualitative data collection during in-country consultations with key informants within a tripartite arrangement (government, employers, organised labour) in the ten study countries, namely Botswana, Lesotho, Malawi, Mozambique, Namibia, Swaziland, South Africa, Zambia, Tanzania and Zimbabwe.

The review was structured as follows:

(a) Macro assessment of each country to build a national profile for mine health and safety

This included:

A macro-economic assessment including: general socio-economic performance indicators, mining sector data, and mining labour data.

A review of the policy and legal framework for occupational risk protection, particularly dust control in the mining sector based on international, regional and sub-regional conventions, frameworks and guidelines.

Organisational and management framework for occupational health and safety in general, and mine health and safety specifically, including institutional mapping. This entailed gathering data on the following stakeholders:

- departments of government involved in occupational health and safety and mine health and safety;
- the employer groups, trade unions and ex-worker associations;
- academic units and NGOs working in the field.

Determining the organisation and management framework for other social protection funds e.g. compensation funds.

(b) Meso-assessment: Assessing the implementation status of occupational risk management and occupational health surveillance systems in the countries and their reach and effectiveness, with emphasis on small- scale and artisanal mining.

(c) Micro-assessment: Assessment of the application of occupational risk- reduction regulations at an enterprise level.

A three-person team, including two international experts and one national expert, undertook the country visits (see also annex 1 country visit dates and team structure).

Data collection methods included the following;

- in-depth face-to-face and telephonic interviews with key informants,
- group interviews,
- observations of occupational health service provision, and
- mining health and safety system assessments during mine site visits.

The findings and results of the review were tested and validated during a country stakeholder workshop conducted at the end of each country mission.

Key informants and industry experts were selected in consultation with the National TB Programme managers and the snowballing technique was used to identify additional informants and key stakeholders during the mission. The sample of mines selected for site visits was based on key informant recommendations, initial research findings and convenience (accessibility and time constraints).

Two large gold mines, one large diamond mine, one large platinum mine, one large copper mine, three medium-sized gemstone mines (tanzanite and emerald), three quarries and one small gold processing plant, as well as several small-scale and artisanal gold, tanzanite and semi-precious gemstone mines were visited during country missions.

In some countries, artisanal small-scale mining (ASSM) refers to illegal mining, while in other countries it refers to mining for which a licence has been issued. In this report, artisanal small-scale mining refers to mining for which a permit has been issued by the relevant authority and operations are mainly based on manual labour and hand tools such as a hammer and chisel.

2.2.2. Reference framework

Research suggests that tuberculosis incidence rates in mineworkers in Southern Africa surpass the WHO emergency threshold by ten times¹². The high incidence rates are related to manifold factors including the relatively high HIV prevalence rates among mineworkers, working and living conditions as well as the prolonged exposure to dust hazards that could lead to silicosis.

The working conditions in mines expose mineworkers to numerous health hazards increasing the susceptibility to contracting tuberculosis. TB transmission is more likely to happen in confined spaces and in dusty, hot and humid working environments, as distinctively prevalent in underground mining operations. Certain open cast mining operations also produce considerable amounts of dust, namely in drilling, cutting, transport and loading areas.

Since the early days of mining, the relationship between dust exposure and occupational lung diseases, has been investigated and described. Mineworker's pneumoconiosis is one of the most well-known occupational diseases worldwide and characterised as a progressive and irreversible lung disease caused by occupational inhalation of dusts or fibres¹². The exposure to so-called respirable crystalline silica and the related damage of lung tissue (silicosis), increases the susceptibility to TB in mineworkers.



¹² Greenberg, M; Waksman, J; Curtis, J (2007): Silicosis: A review. Disease-a-Month, 53:394-416 0011-5029/2007

To reduce the incidence of TB, it is of critical importance to support the prevention of silicosis. This goes along with the control of respirable dusts in the working environment. In a publication on airborne dust in the workplace, WHO defines that “the respirable particulate fraction is that fraction of inhaled airborne particles that can penetrate beyond the terminal bronchioles into the gasexchange region of the lungs^{13,14}”. Examples of dusts for which the respirable fraction offers greatest hazard include quartz and other dusts containing free crystalline silica; cobalt-containing and other hard metal dust.

Specific names have been given to illnesses caused by various dusts shown in table 2 below.

| | |
|--|--|
| Coal workers’ pneumoconiosis (black lung) | Coal workers’ pneumoconiosis is caused by breathing in respirable coal dust. |
| Silicosis | Silicosis is caused by particles of free crystalline silica (quartz, sandstones, flint). |
| Asbestosis | Asbestosis is caused by excessive mineral fibre exposure. These mineral fibres are comprised mainly of silicate chains. They may also cause cancers of the bronchial system, lung tissue and abdominal organs. |
| Siderosis | Siderosis is caused by mineral dusts emanating from iron ore. |
| Stannosis | Stannosis is caused by mineral dusts emanating from tin ore. |
| Aluminosis | Aluminosis is caused by mineral dusts emanating from bauxite ore. |

Table 2. Illnesses caused by different types of dust

Mineworker’s pneumoconiosis is considered a preventable disease today, when appropriate control 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”.¹⁵ 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 stresses the importance of ILO Convention No. 155 and addresses workers’ rights to services that provide for the prevention, detection and compensation of work-related illness or injury, including emergency care, with rehabilitation and reasonable job security after injury and adequate inflation adjusted compensation. For the latter rights, provisions are made in further ILO conventions. The conventions, which are relevant for protecting the workforce in the mining sector, are described in Table 3 (See Annexure 2 for more information).

Key informant interviews were based on a set of questions contained in an interview guideline (Annexure 3).

Table 3: Overview of relevant ILO conventions

| | |
|---|---|
| ILO Convention No. 155 | C155 on occupational safety and health (OSH) provides for the adoption of a coherent national occupational safety and health policy. |
| ILO Convention No. 176 | C176 on safety and health in mines mandates the employer to assess, eliminate and control all occupational health risks for the worker |
| ILO Convention No. 159 | C159 on vocational rehabilitation and employment (disabled persons) convention |
| ILO Convention No. 161 | C161 on occupational health services provides a model for establishing requirements for the organisation and functioning of occupational health services |
| ILO Recommendation No. 171 | Occupational Health Services Recommendation stresses the importance of monitoring of workers’ exposure to health hazards, the provision of personal protective equipment (PPEs) and the better adaptation of the workplace to workers’ health |
| ILO Convention No. 187 | C187 is a promotional framework for occupational safety and health |
| ILO Conventions No 017; No. 018 or their revised version No. 042 | C017; C018; C042 are concerned with the compensation of occupational injuries (C017) and diseases (C018/042) |

^{13,14}Note: Dust particle smaller than 10 microns are labelled as respirable dust.

¹⁵ Fedotov, I (2003): The ILO/WHO Global Programme on Elimination of Silicosis. GOHNET Issue No. 5.

The following reference framework was utilized for the legislative review:

- The international ILO conventions,
- SADC Charter of Fundamental Rights,
- WHO Programme on the elimination of silicosis and
- The global Post-2015 End TB Strategy with its three pillars;
 - i. Bold and supportive systems;
 - ii. Integrated patient-centred care and prevention, as well as
 - iii. Research and innovation.

Occupational health service provision has been evaluated against the 'Basic Occupational Health Service Model (BOHS)' as presented in figure 1

Figure 1: Basic Occupational Health Service model illustrating stepwise development of occupational health services.

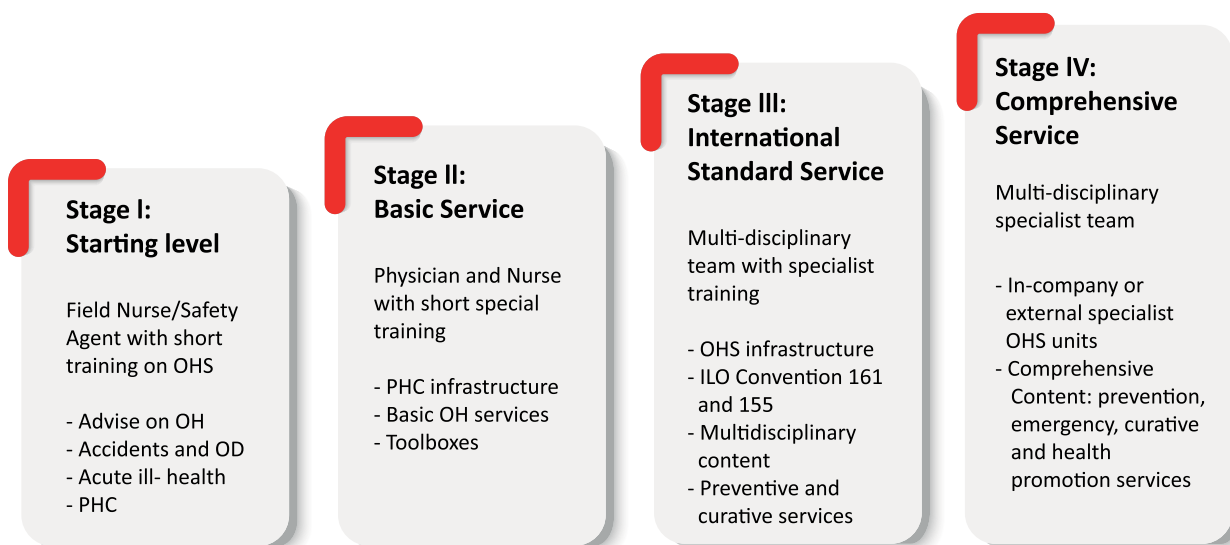


Figure 1: Basic Occupational Health Service model illustrating stepwise development of occupational health services.

(ODs = occupational diseases, PHC = Primary Health Care, OHS = occupational health services, SME = small and medium-sized workplace, SSE = Small enterprise, SE = Self-employed, IFS = Informal sector). Source: Adapted from Timo Leino, FIOH, 2008; Ref. J. Rantanen, S. Lehtinen



Table 4 below summarises the overall reference framework used for this review.

| End TB Strategy Pillars* | International frameworks, standards/models supporting the end-TB pillars in the world of (mine) work | Translation into action in the mining sector |
|---|---|--|
| Pillar 1 – Integrated, patient-centred care and prevention | Application of Basic Occupational Health Services (BOHS) model ¹⁶ in the mining industry including regular screening of mineworkers for occupational diseases and provision of primary health care services. | Patient-centred care and prevention: <ul style="list-style-type: none"> • Prevention of exposures to harmful working environments (heat, noise, humidity, dusts – occupational hygiene systems); • Regular screening of mineworkers and ex-mineworkers for occupational lung diseases including TB; • Provision of primary healthcare, including TB treatment and care, either on mining sites or within the public healthcare system after referral. |
| Pillar 2 – Bold policies and supportive systems | Universal health coverage Occupational health and safety systems based on ILO conventions with effect on the mining sector: ILO Convention No. ¹⁷ <ul style="list-style-type: none"> • C155, (1981) on Occupational Safety and Health (OSH); • C161 (1983) on Occupational Health Services (OHS); • C171 (1985) Occupational Health Services Recommendation; • C187 (2006) Promotional Framework for Occupational Safety and Health. | Legislation, policies and regulations geared towards <ul style="list-style-type: none"> • Mine health and safety with emphasis on occupational hygiene regulations (mining sector) geared towards the prevention of pneumoconiosis and tuberculosis, with emphasis on dust control (occupational hazard exposure limits (OELs) and controls); • Prevention of occupational diseases; • National surveillance of occupational diseases; • Treatment and care of occupational diseases; • TB clearly integrated as an occupational and compensable disease in mine work. |
| | Social protection <ul style="list-style-type: none"> • ILO Convention C159 Vocational rehabilitation and employment (disabled persons) convention, 1983 (No. 159); • ILO Conventions C017 and C018 as well as C018's revised version C042 Compensation of Occupational Injuries (C017) and Diseases (C018/042). | Legislation, policies and regulations - occupational health and safety – and their application: <ul style="list-style-type: none"> • Compensation of non-curable occupational diseases and conditions including the ex-mineworker community; • TB clearly integrated as an occupational and compensable disease in mine work; • Provisions made for functional and vocational rehabilitation following an occupational injury. |
| | Political commitment <ul style="list-style-type: none"> • C176 on Safety and Health in Mines; • ILO/WHO Global Programme for the Elimination of Silicosis (GPES). | Legislation, policies and regulations and their application: Mine health and safety with emphasis on occupational hygiene (mining sector) geared towards the prevention of pneumoconiosis and tuberculosis, with emphasis on dust control (hazard exposure limits and controls). |
| Pillar 3 – Intensified research and innovation | Mine) Workers' health surveillance (based on ILO Technical and ethical guidelines for worker's health surveillance ¹⁸ <ul style="list-style-type: none"> • Assessments of workers' health; • Biological tests and other investigations; • Sickness monitoring; • Recording and notification systems; • Surveys, voluntary programmes and inspections. | Availability of <ul style="list-style-type: none"> • Baseline information on TB incidence in the mining sector; • Baseline information on silica exposures in the mining sector; • Surveillance and monitoring systems for TB and occupational diseases/injuries. |

* For this report, Pillar 1: Bold policies and supportive systems, is discussed first followed by Pillars 2 and 3.

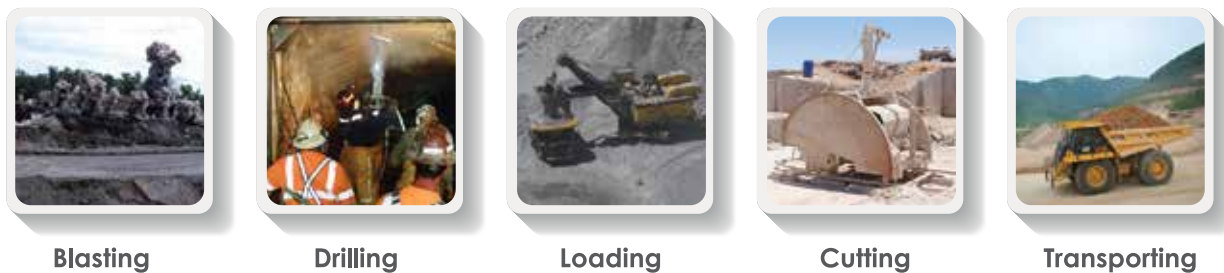
¹⁶ Rantanen J. (2005): Basic Occupational Health Services. Table 4. Reference framework A WHO/ILO/ICOH 2nd revised edition. 2 April 2005, Finnish Institute of Occupational Health, Helsinki.

¹⁷ See annex one: Overview of most relevant ILO conventions

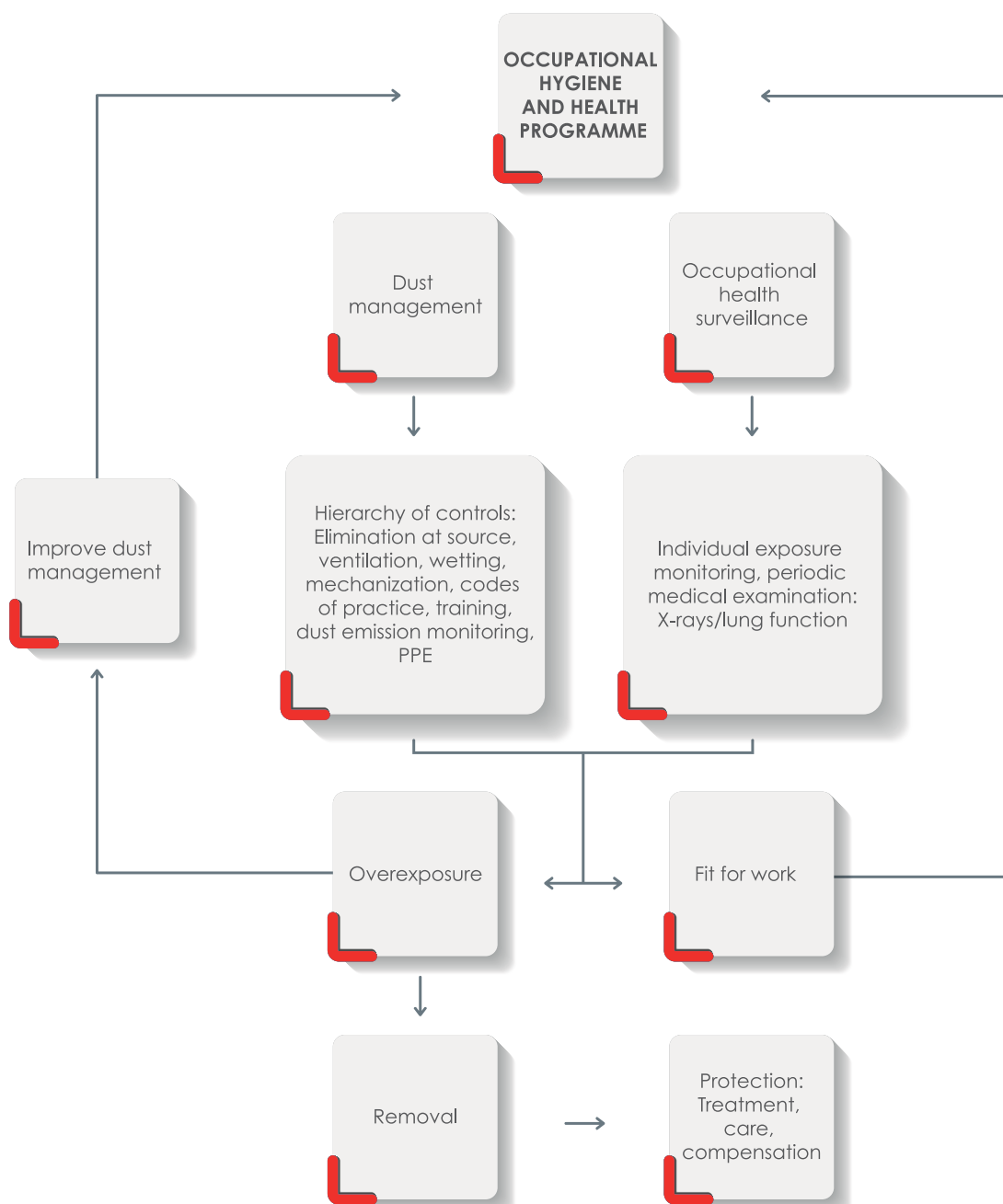
¹⁸ International Labour Office Geneva (1998): Technical and ethical guidelines for workers' health surveillance. Occupational safety and health series No.72. ISBN 92-2-110828-7

The diagram below outlines a comprehensive dust control system, that protect mineworkers from occupational lung diseases or their consequences.

DUST GENERATION



PREVENTION



SOCIAL PROTECTION

Figure 2. Dust management model

2.2.3. Limitations of this study report

This consolidated report provides a summary of review findings and contains recommendations for better regional harmonisation of mine health and safety legislation and systems. Recommendations addressing challenges in the individual countries are contained in the country-specific reports. Given the complexity of legal systems and the diversity of mining sector structures in the ten study countries, the findings and conclusions in this report reflect the general pattern derived from the review and in-country assessments. Particularly, where the application of OHS legislation in the mining sectors is concerned, only a non-representative sample of large, medium and small-scale and artisanal mines could be visited and OHS systems assessed. However, the findings of assessments were triangulated with a broad group of stakeholders in each country using a tripartite arrangement and validated during a stakeholder workshop at the end of each country mission.



3. MAIN FINDINGS

3.1. Socio-economic background and mining sector role in study countries

The ten study countries are part of the Southern African Development Community (SADC). Although SADC countries generally show better performance indicators for the economy, population and health, than the sub-Saharan region, the selected study countries differ significantly in their socio-economic status. Table 5 compares key socio-economic indicators of the ten countries.

Table 5: Comparison of socio-economic and health indicators of study countries.

| Country | Population (million)(2016) ⁽¹⁾ | GNP per capita (US\$ 2015) ⁽²⁾ | Life Expectancy ⁽³⁾ | Maternal Mortality (per 100,000) ⁽⁴⁾ | Under 5 Mortality (per 1000 live births) ⁽⁵⁾ | Literacy rate % of population ⁽⁶⁾ |
|--------------|---|---|--------------------------------|---|---|--|
| Botswana | 2.3 | 6,510 | 65.7 | 129 | 43.6 | 97.81 |
| Lesotho | 2.1 | 1,330* | 53.7 | 487 | 90.2 | 85.09 |
| Malawi | 17.8 | 350 | 58.3 | 634 | 64.0 | 75.08 |
| Mozambique | 28.8 | 580 | 57.6 | 489 | 78.5 | 76.75 |
| Namibia | 2.5 | 5,210 | 65.8 | 265 | 45.5 | 94.88 |
| South Africa | 58 | 6,050 | 62.9 | 138 | 40.5 | 99.03 |
| Swaziland | 1.3 | 3,230 | 58.9 | 389 | 60.7 | 94.77 |
| Tanzania | 55.2 | 910 | 61.8 | 398 | 48.7 | 87.31 |
| Zambia | 16.7 | 1,500 | 61.8 | 224 | 64.0 | 91.52 |
| Zimbabwe | 16 | 850 | 60.7 | 443 | 70.7 | 91.75 |

Source: (1) United Nations Worldometers; (2) World Bank, *indexmundi; (3,4,5) World Health Organisation; (6) UNESCO Literacy Statistics 2015



Botswana, Namibia, Swaziland and Zambia belong to the lower middle-income countries, while South Africa has kept its status as a middle-income country and is one of the fastest growing and emerging markets, evidenced by its inclusion into the BRICS (Brazil, Russia, India, China, South Africa) community. Lesotho, Malawi, Mozambique, Tanzania and Zimbabwe belong to the group of low-income countries.

The mining industry plays an important role in the economy of all study countries. Table 6 summarises key mining sector information.

Table 6: Key information on mining sectors of study countries

| Country | Main commodities | Contribution of mining in % GDP | Contribution to exports | Formal workforce |
|--------------|---|---------------------------------|-------------------------|----------------------|
| Botswana | Diamonds, copper, silver, gold, coal | 35% (2011) ¹⁹ | 72% | 11,840 ²⁰ |
| Lesotho | Diamonds | 7,7% (2015) ²¹ | - | 3,000 |
| Malawi | Gold, iron ore, uranium, titanium and zirconium, niobium and zantalum | 5,2% (2013) ²² | 25% ²³ | 4600 ²⁴ |
| Mozambique | Coal, gold, aluminium | 3.2% (2013) ²⁵ | - | - |
| Namibia | Diamonds, gold, coal, uranium, copper, and rare earth minerals | 12% (2011) | 60% ²⁶ | 8000 |
| South Africa | Gold, diamonds, platinum, coal, chromium, iron, vermiculite, copper | 8,6% (2013) ¹ | 60% | 500,000 |
| Swaziland | Coal, diamonds, gold, kaolin and silica | 2% | 2% | < 1000 |
| Tanzania | Gold, tin, phosphate, iron ore, coal, graphite, diamonds, tanzanite, gemstones, nickel | 3,5% (2013) ² | 52% | 15,000 |
| Zambia | Copper, cobalt, lead, zinc, coal, silver, gold, emeralds, gemstones | 7,2% (2014) ³ | 80% | 92,000 |
| Zimbabwe | Gold, diamonds, iron, palladium, platinum, rhodium, selenium, silver, tin, barite, graphite | 22% (2014) ⁴ | 52% | 40,000 |

Countries differ in the way they classify mines depending on the size of the yield, the number of staff employed and equipment/technology used or the actual size of the mining area.

¹⁹ African Economic Outlook (2013): Botswana 2012. African Development Bank, OECD, UNDP, UNECA

²⁰ Bank of Botswana, 2014, p. S.8, S.26–S.27

²¹ Minister for Mining Lebogang Thotanyana during a speech launching Lesotho's Minerals and Mining Policy on 12th of June 2015

²² Reserve Bank of Malawi, 2013, p. 22, 24, 60

²³ World Bank (2009): Mineral Sector Review Source of Economic Growth and Development, World Bank Staff estimates

²⁴ Personal communication with Chamber of Mines (2016)

²⁵ The Economist Intelligence Unit (2016), Overblown expectations of the mining sector, p.1

²⁶ Index Mundi: Namibia economy profile 2016. Online: http://www.indexmundi.com/namibia/economy_profile.html. Accessed: 15.02.2016

When looking at mine health and safety challenges, the ten countries can be divided into three groups with similar mining industry patterns. In South Africa, Botswana, Namibia and Zambia, the mining sector is dominated by large-scale mines fully or partly owned by transnational mining corporations. There is also a considerable medium-size mining segment, while small-scale and particularly artisanal small-scale mining exists, but is relatively small.

In Tanzania, Mozambique and Zimbabwe, large-scale mining operations play an important role in the sector, but all three countries have a significant artisanal small-scale mining segment, which provides informal jobs to several hundred thousand people.

The mining sectors in Swaziland, Lesotho and Malawi are still small and underdeveloped. Artisanal, small-scale mining exists, but is not prominent. The volatility of the commodity market in recent years has impacted negatively on the economies of all study countries, resulting in job losses from retrenchments due to mine closures and staff reductions at operations. Furthermore, the large-scale mining industry is becoming more advanced and automated each year to remain internationally competitive, resulting in decreasing numbers of formally employed mineworkers.

3.2. Regional harmonisation of legislative frameworks

The level of ratification of international labour conventions is very low in study countries (table 5). ILO Convention C155, which is highlighted in Article 12 of the Charter of Fundamental Rights in SADC has only been ratified by South Africa, Zambia and Lesotho so far. The ratification status of ILO conventions suggests that there is little harmonization in the field of labour laws among study countries. However, the review of actual legislative frameworks in countries shows that many principles and recommendations contained in the above conventions have been incorporated into national legislation.

The SADC “Protocol on Mining” strives for the harmonisation of policies and procedures for mineral extraction in the mining sectors of member states as well as for increased regional cooperation to improve technical capacity and knowledge sharing. In 2006, the SADC mining Ministers approved the framework “Harmonisation of Mining Policies, Standards, Legislative and Regulatory Framework in Southern Africa” and a “Harmonisation Implementation Plan” was adopted in 2009. The plan was expected to support member states in formulating policies and creating a regulatory and administrative environment leading to an optimized development of their mineral resources sector.

The plan contains eight harmonisation themes, of which theme four targets safety, health and environmental concerns in the mining sector²⁷. There is no evidence that SADC or the member states have made effort to implement the harmonisation plan.

Table 7 summarises the ratification status of labour conventions relevant to occupational health and safety as well as mine safety.

Table 7: Ratification of ILO Conventions and recommendations

| Country | Bot | Les | Mal | Moz | Nam | SA | Swaz | Tanz | Zam | Zim |
|------------------------|-----|-----|-----|-----|-----|----|------|------|-----|-----|
| Convention No. 155 | - | X | - | - | - | X | - | - | X | - |
| Convention No. 159 | - | - | X | - | - | - | - | - | X | X |
| Convention No. 161 | - | - | - | - | - | - | - | - | - | X |
| Recommendation No. 171 | - | - | - | - | - | - | - | - | - | - |
| Convention No. 176 | X | - | - | - | - | X | - | - | X | X |
| Convention No. 187 | - | - | - | - | - | - | - | X | X | - |
| Convention No. 17 | - | - | - | X | - | - | - | - | X | - |
| Convention No. 18 | - | - | - | X | - | - | - | - | X | - |
| Convention No. 19 | X | - | - | - | - | X | - | X | - | X |

Most relevant ILO conventions with effect on the mining sector: ILO Convention No. 155, (1981) on Occupational Safety and Health (OSH) provides for the adoption of a coherent national occupational safety and health policy; C159 Vocational rehabilitation and employment (disabled persons) convention, 1983 (No. 159); ILO Convention No. 161 (1983) on Occupational Health Services (OHS) provides a model for establishing requirements for the organization and functioning of occupational health services; the Occupational Health Services Recommendation No. 171 (1985) stresses the importance of monitoring of workers’ exposure to health hazards, the provision of personal protective equipment (PPEs) and the better adaptation of the workplace to workers’ health; ILO Convention No. 187 is a Promotional Framework for Occupational Safety and Health (2006); ILO Convention No. 176 on Safety and Health in Mines mandates the employer to assess, eliminate and control all occupational health risks for the worker; ILO Conventions C017 and C018 as well as C018’s revised version C042 are concerned with the Compensation of Occupational Injuries (C017) and Diseases (C018/042). Source: ILO

²⁷ SADC and United Nations Economic Commission for Africa Southern Africa Office (2008): Implementation plan for the harmonisation of mining policies, standards, and legislative and regulatory frameworks in Southern Africa. ECA/SA/Tpub/2008/01. April 2008



3.3. Prevention of occupational lung diseases

South Africa

South Africa has the most mature mining industry on the continent. Large-scale mining started with the discovery of diamonds in 1867 and the mining industry has been the backbone of the country's economy ever since. The country's rather complex mining legislation reflects this long tradition. Provisions for occupational health and safety in mining are made in several Acts. The 'Mine Health and Safety Act (MHSA) of 1996 is administered by 'Department of Mineral Resources (DMR) and places firm accountability on the mine owner. The 'Mine Health and Safety Inspectorate (MHSI) situated within the DMR is the country's largest specialist occupational health and safety inspectorate. Beside the inspectorate, South Africa has established a 'Mine Health and Safety Council (MHSC) promoting occupational health and safety within the industry and advising the DMR on health and safety matters.

The MHSC is a tripartite structure comprised of representatives from the state, mine employees and mine owners. South Africa is the only Southern African country that has committed to a national program for the elimination of silicosis. The programme aims to reduce the prevalence of silicosis by 2015 and to eliminate silicosis in workplaces by 2030. The country has established a regulatory and enforcement system, which focuses on the prevention of exposure. A central element of the programme is the 'Mandatory code of practice for an occupational health programme on personal exposure to airborne pollutants²⁹. The South African 'Chamber of Mines (COM)' has played a critical role in the rollout of the programme in the mining industry through its 'Mine Occupational Safety and Health (MOSH) learning hub. South Africa is also the only country in the region where silica dust exposure data for mining areas across the country are available and support the development of exposure profiles.

²⁹ Published under South Africa Department of Mineral Resources Guideline Circular No: 035-OHTTT-28-08-2006.

Botswana, Namibia, Zambia

In Botswana, Namibia and Zambia, the mining sectors are dominated by large-scale mines fully or partly owned by transnational mining corporations. There is also a considerable medium-size mining segment, while small-scale and particularly artisanal small-scale mining exists but is relatively small. Mining, in the three countries, has a long tradition and mine health and safety systems have been built up over decades. The legislation in all three countries is non-specific, particularly in the field of the prevention of occupational lung diseases.

Botswana's 'Mines, Quarries, Works and Machinery Act of 1978 Part XII on Ventilation, Dust and Toxic Gases' is quite detailed and particularly relevant to silica dust exposure management. Regulations 108 to 148 include engineers' roles and responsibilities with regards to adequate ventilation, use of personal protective equipment, and removal from exposure to dust and fumes. Specifically, Regulation 108 makes provision that the manager shall take such steps as are necessary to ensure that adequate ventilation is supplied to all places in which persons are travelling or working. However, occupational exposure limits (OELs) for respirable dust hazards have not been issued (i.e. silica dust, anthracite dust etc.), although regulation 109 states that the chief mining engineer may impose, 'the maximum permissible amount of any harmful dust content in the general body of the air'. Regulation 113 points out that an effective respirator shall be provided to any person who during his normal work is likely to be exposed to excessive amounts of toxic gas, fumes or dust. A new unifying OHS policy has been developed in 2011 but not yet approved.

OHS in Namibia is governed by the 'Labour Act' (Labour Act 1992: Regulations relating to the Health and Safety of Employees at work) and is generally overseen by labour inspectors under the 'Ministry of Labour and Social Welfare'. The 'Labour Act' [Schedule 1(2)] prescribes fixed exposure limits for airborne hazardous substances, and more detailed silica regulations [Schedule 2(3)]. The development of mining-related health and safety regulations within the 'Ministry of Mines and Energy' is in progress but not yet promulgated or in force.



Zambia's 'Mines and Minerals Development Act' (2015), the countries 'Occupational Health and Safety Act No. 36 of 2010' and the Factories' Act of 1964 do not make any definite provisions on the protection of workforces from health hazards in the working space. The Ministry of Labour and Social Security has elaborated a draft document regulating the 'Control of hazardous substances at work'. It contains OELs for various hazards including respirable crystalline silica dust. None of the three countries is yet prescriptive on how dust levels shall be monitored nor are individual mineworker's hazard exposures recorded or reported. Labour, health and mine safety inspectors share a joint responsibility for overseeing the health and safety of the mining workforce, but coordination is almost non-existent. Inspectorates are understaffed and underequipped, inspection guidelines geared towards dust control are lacking and limited budgets are available to inspect mines across all three countries. Mine safety and labour inspectors in Namibia said that qualified occupational hygienists would rather work in the private sector, given the more attractive salary and benefit schemes paid by the industry.

The large transnational mines in the three countries are however mindful about dust emissions and dust exposures. All the large-scale mines visited have set up risk-based dust control and monitoring systems in line with their international control and governance standards. The actions of international mining corporations are globally observed and pursuing certifications such as ISO 14000 (environmental certification), SA 8000 (working conditions certification), OHS 18000/1 and AA 1000 (accountability certification), certainly positively influences the way health, safety and environment systems are designed and managed. In Namibia and Botswana, personal dust monitoring using gravimetric sampling was the norm in large-scale mines. In Zambia, the industry is about to move from old-fashioned spot sampling towards personal dust monitoring.

The quality of dust control and occupational hygiene in medium-sized mines and quarries varies from compliance to international standards to being inadequate, depending on the ownership. The weak inspection and enforcement systems contribute largely to the non-compliance of mine owners.

Small-scale mines and artisanal mines have limited dust control systems in place and are almost never inspected.

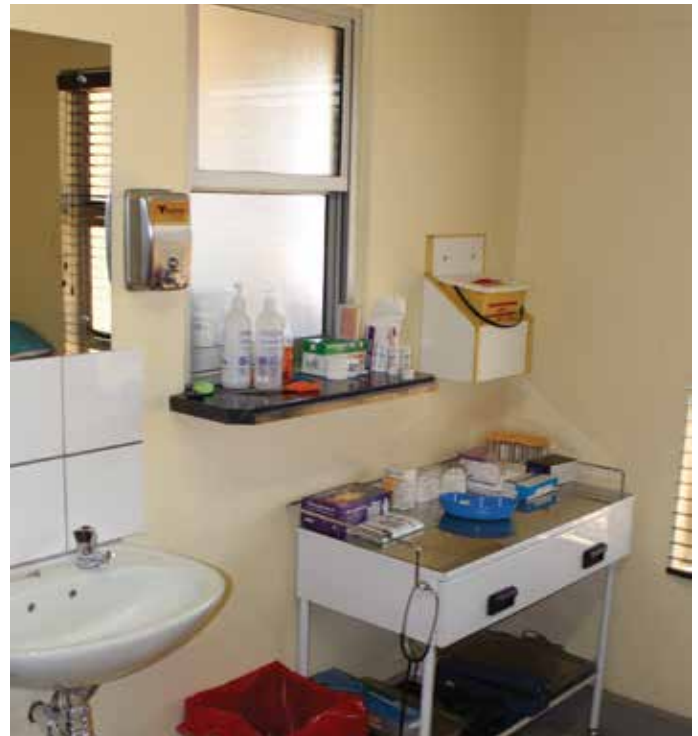
The Namibia Chamber of Mines tries to impose health and safety standards on members when non-compliance with regulations is brought to their attention.

Tanzania, Mozambique, Zimbabwe

In Tanzania, Mozambique and Zimbabwe, large-scale mining operations play an important role in the sector, but all three countries have also a significant artisanal small-scale mining segment, which provides informal jobs to several hundred thousand of people (Estimates: Tanzania 35,000 so called primary licenses²⁹ issued with an estimated workforce of 750,000 artisanal mineworkers; Zimbabwe estimated artisanal workforce of 500,000; Mozambique estimated artisanal workforce of 750,000).

Amongst these three countries, Tanzania has a rather progressive occupational health and mine health and safety legislation. Tanzania's Occupational Health and Safety Act No. 5 of 2003 provides for the safety, health, and welfare of persons at work in factories, construction, agriculture and in public sectors, local government services, and public authorities. There are no extra provisions for the mining sector. The Act addresses identification, registration, inspection, monitoring and evaluation of all OSH issues on mainland Tanzania. Section 96 of the Act requires every employer who has more than four employees in his employment to prepare a written policy on the protection of health and safety of employees, including an implementation plan for their OHS policies. The Tanzania Bureau of Standards has issued an exposure limit for crystalline silica exposure, which is in line with international standards (see table 8 below). The Mining (Safety, Occupational Health and Environment Protection) Regulations of 2010 provide gas and dust control frameworks without being very specific.

The Constitution of the Republic of Mozambique establishes the right of the worker to hygienic and safe working conditions. The employer shall guarantee the observance of rules on hygiene and safety at work, as well as shall investigate the causes of work accidents and occupational illnesses, and shall take appropriate preventive measures³⁰. Mine health and safety matters are mainly regulated in the New Mining Law Nr. 20 of 2014 and the Technical Safety and Health Regulations for Mining and Geological Activities (Decree No. 61/2006) containing detailed provisions for the prevention of dust formation, the reduction of dust at its formation source, the elimination of dust in suspension, adequate and sufficient ventilation, the introduction of moistening processes, etc. as well as provisions for periodical measurement of dust quantities including provisions for measures to be taken whenever the indicated values are exceeded³². The Ministry of Mineral Resources and Energy (Ministério dos Recursos Minerais e Energia) (MIREME), administers the New Mining Law. The Inspectorate-General of Mineral Resources (functional since 2013) is the responsible authority for enforcing compliance with regulations on health, safety and hygiene. The New Mining Law prescribes detailed OEL for dust hazards (see table 8).



In Zimbabwe, mine health and safety standards are defined in the *Mining Regulations*. Part V particularly addresses the following:

- Reg. 60: machine drilling not to be done dry,
- Reg. 62 wetting down,
- Reg. 63/64 on water supplied percussion-machine drilling,
- Reg. 65 on water blasts (critical to allay dust after blasting in tunnels),
- Reg. 66 ventilation (Requirements pertaining to ventilating air in the workings),
- Reg. 67 no working in harmful air,
- Reg. 69 actions required when persons exposed to smoke, gas, fumes, dust or harmful temperatures,
- Reg. 70 permissible quantities of gas, noxious dust and asbestos dust,
- Reg. 71 Precautions against harmful dust.

While there are several very precise regulations, Reg. 70 does not pin down specific OELs for noxious dust in the workplace nor does Reg. 66 make mention of minimum quantities or velocities of ventilation supplies, for or in, underground excavations.

OSH is mainly governed by the out-dated *Statutory Instrument (SI) 68* of 1990; Act /89 which does not make any provisions for mine health and safety. No OELs are provided.

The legislation in the three countries is quite comprehensive, the *New Mining Law* of Mozambique and its regulations is, beside the South African laws, the most elaborate regulatory framework among the study countries.

However, the inspectorates of the three countries are not capacitated in terms of human resources, technical competence, equipment, work plans and budgets to fully assume their role as the regulators in the mining sector. Their role is made even more difficult when the large, artisanal small-scale mining segment is considered. Inspections of small-scale or artisanal small-scale mines, are infrequently conducted and neither are any of the existing regulations enforced.

²⁹ Law 23/2007, Article 54;59, Labour Law

³⁰ Article 285, Decree n.º 61/2006, Regulations on technical safety and health for geological and mining activities



The World Bank has launched projects supporting the artisanal mining sector in Tanzania and Mozambique. These projects focus on introducing advanced technologies preventing environmental damage (particularly replacing mercury in gold processing) and facilitating physical mine work. These projects do not address occupational hygiene matters, apart from mercury, which is a significant risk to health.

For the transnational large-scale mining sector, the same can be said as for Botswana, Namibia and Zambia. The mines have set up risk-based dust control and monitoring systems in line with their internal control and governance standards and international quality standards (ISO and others). Small-scale mines, and in particular, artisanal mines, do not have any dust control systems in place. Often mine managers consider the use of PPE as an effective protection against dust hazards. The health threats caused by dust are of no concern to the mineworkers in artisanal small-scale mines. The myth that milk would clear the body from dust is prevalent in all three countries.

Swaziland, Lesotho, Malawi

The mining sectors in Swaziland, Lesotho and Malawi are still small and underdeveloped. Artisanal small-scale mining exists but is not prominent.

The Department of Minerals and Mines, under the Ministry of Natural Resources and Energy of Swaziland, administers the Mines and Minerals Act 4 of 2011, which does not make any mine health or safety provisions. The Occupational Health and Safety Act 9 of 2001 stipulates that it is the employer's obligation to control hazards in the workplace and refers to a Tripartite Advisory Experts Committee that can set standards for occupational health and safety. There is no evidence that such standards have ever been issued.

The Ministry of Mines and Minerals in Lesotho administers the Mine Safety Act of 1981 and the Mines and Minerals Act of 2005. The Mining Department under the Ministry is responsible for inspections of mines. However, at the time of the country missions, all inspector's positions were vacant. The department has financial and budgetary constraints and a lack of resources. In Lesotho, health and safety inspections fall under the jurisdiction of the Department of Labour, which administers the Labour Code of 1992. It is the Labour Code that speaks to matters of occupational hygiene and dust control, but the provisions made are very general. Section 106 refers to the employer's obligation to remove harmful dust and fumes from the working environment. Labour Code Section 109 obliges the employer to provide employees with PPE. Specifically, the Labour Code Order Schedule 7 states that '...adequate precautions shall be taken in any excavation, shaft, earthworks, underground works or tunnel to secure adequate ventilation at every workplace to maintain an atmosphere fit for respiration and to limit any fumes, gases, vapours, dust or other impurities to levels which are not dangerous or injurious to health ...', but does not specify exposure limits.

In Malawi, the Mining Inspectorate, under the Ministry of Natural Resources, Energy and Mines, is charged with overseeing the compliance to the Mines and Minerals Act of 1981. This Act does have (Safety) Regulations and under Statute 128, GN 99/1982, Part II regulations are made to address "Health, Safety and Accidents". Regulation 16 speaks to dust in the working place but is very vague and Regulation 17 makes provision for water being used in rock drills and then also stipulates the water pressure (2.2kg/cm²) – no other reference is made to maximum dust levels or their measurement or specific controls required to manage the dust in working places. Artisanal miners are not regulated or inspected by any of the labour or mining inspectors. Small- scale and medium- scale mines are however inspected from time to time.

In conclusion, the legislation of the three latter countries is vague and lacks the detail needed to orient the inspectorates or the industry towards comprehensive occupational hygiene programmes. Just as in the other study countries, the inspectorates are understaffed, underequipped and underfinanced. Where the industry is not self-regulating based on international standards, mine health and safety concerns are not addressed.

For all countries, apart from South Africa, it can be said that comprehensive baseline data on silica dust exposures are not available. Where the industry collects data, these are not shared with the authorities.

Further, the Trade Unions have not sufficiently addressed health and safety matters of their members, focusing primarily on wage increase and the practice of contracting out mine work to sub-contractors. Even the mineworkers themselves are less concerned about their health and safety and more concerned about remuneration. The myth that milk cleans the body from dust is prevalent in mineworkers and Union representatives across countries³¹. Table 8 below gives an overview of the legislature each country has adopted in relation to dust control.

³¹ Key informant interviews

Table 8: Overview of legislation relevant for dust control in the mining sector

| Country | Legislation | OEL for crystalline silica dust | Regulations on dust control and monitoring in the workplace | Prescription of dust measurement methods |
|---------------------|--|--|--|--|
| Botswana | Mines, Quarries, Works and Machinery Act of 1978 | None, although Regulation 109 states that the engineer may impose, 'The maximum permissible amount of any harmful dust content in the general body of the air', | Part XII on ventilation, dust and toxic gases: Regulations 108 to 148 include engineers' roles and responsibilities with regards to adequate ventilation, use of personal protective equipment, and removal from exposure. Regulation 108 provides that "the manager shall cause such steps to be taken as are necessary to ensure that adequate ventilation is supplied to all places in which persons are travelling or working". | None |
| Lesotho | Labour Code of 1992 | None | Section 106 of the Labour Code refers to the employer's obligation to remove harmful dust and fumes from the working environment, no further specifications. | None |
| | Mine Safety Act 1981 | None | No provisions. | |
| Malawi | The Mines and Minerals Act of 1981 | None | Regulations made under the Mines and Minerals Act Part II Health, Safety and Accidents Section 16: General dust precautions, ensure that (a) that the entry of the dust into the air, and its accumulation in any place where it might be harmful, is minimized by means of adequate measures taken as near as possible to the point of origin of the dust; and (b) that any of the dust which enters the air is trapped, removed, or so dispersed as to render it harmless. Section 17: Dust from rock drills: Every percussion rock drill used in underground workings (a) shall be supplied with water at a pressure of not less than 2.20 kilograms per square centimetre and in such quantity and manner that all dust made by drilling is wetted; and (b) shall be fitted with front-head air release ports. | None |
| Mozambique | Technical Safety and Health Regulations for Mining and Geological Activities: Council of Ministers' Decree n° 61/2006, Article 285 | Max. tolerable concentration of breathable silica in air: Silica content below 5% - 5mg/m3 Silica content 5% - 25% - 2mg/m3 Silica content > 25% - 1mg/m3 | Technical Safety and Health Regulations for Mining and Geological Activities (Decree No. 61/2006) containing detailed provisions for the prevention of dust formation, the reduction of dust at its formation source, the elimination of dust in suspension, adequate and sufficient ventilation, the introduction of moistening processes, etc. as well as provisions for periodically measurement of dust quantities including provisions for measures to be taken whenever the indicated values are exceeded ³² . | None |
| Namibia | Labour Act 6 of 1992: regulations relating to the health and safety of employees at work. | Crystalline silica 0,05 mg/m3 Silica quartz 0,1 mg/m3 | General: Employer to take adequate measures for hazard exposure measurements, systematic recording of data and reporting to the Chief Medical Officer Occupational Health in case of exposure above limit. Specific silica regulation: Prescribes preventive measures in terms of ventilation, wetting systems and PPE provision. | None |
| South Africa | Mine Health and Safety Act, 1996 (Act 26 of 1996) as amended | Crystalline silica 0,1mg/m3 | Mandatory Code of Practice under DMR Guideline Circular No: 035-OHTTT- 28-08-2006 as per Section 9(2) and (3) of MHSA | Gravimetric and Personal Monitoring |
| Swaziland | Occupational Health and Safety Act – Act 9 of 2001 | No silica OEL | General provisions: Employer to ensure systematic of way of identifying, evaluating and controlling hazards at the workplace. | None |

³² Article 285, Decree n." 61/2006, Regulations on technical safety and health for geological and mining activities

| | | | | |
|-----------------|---|---|--|------|
| Tanzania | Mine (Safety, Occupational Health and environment Protection) Regulations 2010 | Silica OEL issued by Tanzania Bureau of Standards: 0.1 mg/m ³ | General provisions in section on ventilation: "the workings of every part of a mine where persons are required to travel or work shall be properly ventilated to maintain safe and healthy environmental conditions for the workmen and the ventilation air shall be such that it will dilute and render harmless any inflammable or noxious gases and dust in the ambient air." | None |
| | Occupational Health and Safety Act, 2003 | see above | General provision in section 45: "... the removal and prevention of the accumulation of dust, gas or vapour ..." | None |
| Zambia | Occupational Health and Safety Bill of 2010; Draft: Control of hazardous substances at work regulations | Crystalline silica- Cristobalite 0.05 mg/m ³ Quartz 0.1 mg/m ³ | General provisions: Duty of employer to ensure, if reasonably practical, the health, safety and welfare of employee. Draft regulations with OEL for crystalline silica not in force yet. | None |
| Zimbabwe | Mining (Managements and Safety) Regulations (Statutory Instrument 109 of 1990) | No Silica OEL | Mining Regulations 60 – 71 provide a framework for dust control in mining workplaces. | None |

3.4. Occupational health surveillance and service provision

South Africa

Occupational Health Care service provision in the mining sector in South Africa is regulated by the Mine Health and Safety Act of 1996 (MHSA), whereby the employer is responsible for the provision of occupational health screening and medical service provision.

All regulated mines in South Africa provide PHC and occupational health services, either on site or utilising the services of an OH service provider. The DMR 'Guideline for Compilation of a mandatory code of practice' guides service provision on Minimum Standards of Fitness to Perform Work at a Mine. Risk-based medical surveillance examinations are statutory examinations, undertaken for all employees identified as being at risk to the hazards identified. Examinations are undertaken at least annually for employees identified as high risk in the 'occupational risk exposure profile (OREP)', periodically thereafter, and on exit or on departure from the mine. Each mine keeps its own record of service per employee, as well as the retention of the medical surveillance record, which should be kept for 40 years, as per MHSA. In addition, fitness-to-work examinations are undertaken when the risk changes through change of occupational exposures, illnesses and injuries. Specific health priorities in the South African Mining Industry that require focussed attention are; HIV/AIDS, TB, and silicosis (HATS) and medical surveillance systems. Most large mining houses incorporate and integrate HATS services into the general OHS of the mines. Large mines (> 5000 employees) and even some smaller mines, would usually operate at a BOHS level III or IV. Remote mining sites often use the services of a general practitioner who has occupational health qualifications, or utilise the services of mobile OHS, BOHS levels I and II. Large mining houses in South Africa have designed and implemented Health Hubs. These are PHC and occupational health facilities integrated under one roof, where workers can access the full value chain of comprehensive OHS close to where they live and work.

Health care workers in these settings are either employed by the mine itself or services are outsourced to a managed care organisation. These mining houses, to further enhance efficiencies in cost and service delivery, typically enter service level agreements with private hospitals, specialist networks, emergency medical response teams, provincial and district health services, to ensure optimal care and treatment for their workers.

Botswana, Namibia, Zambia

In Botswana, the 'Ministry of Labour and Home Affairs is the main custodian of OHS. There are further OHS provisions made in the 'Mines, Quarries, Works and Machinery Act (CAP44:02 of 1978) (MQWMA) and the 'Factories' Act of 1979. The MQWMA establishes pre-employment medical examination and periodic medical examination for mineworkers. The MQWMA Part XII Regulation 91 explicitly states: 'No person shall be employed at a mine unless such person has been medically examined by a registered medical practitioner and has been certified by that practitioner to be fit for employment'. Further the 'examination shall include an X-ray of the chest; and an audiometric examination'. Respective occupational health services in the mining sector are either carried out onsite within mine-owned health facilities or are outsourced to private OHS providers. The 'Ministry of Health', under its 'Department of Occupational Health', has a specialised unit for 'Environmental and Occupational Health' with an occupational health specialist clinic residing in the Ministry. The clinic also provides occupational health screening examinations and certifies occupational diseases.

Specifically, on TB, Regulation 92 states that, “No person known to be suffering from tuberculosis of the respiratory organs, pneumoconiosis, silicosis, asbestosis or other fibrotic disease caused by mineral dust... or any other infectious disease, shall enter the underground workings of a mine for the purpose of working therein, and no manager shall knowingly employ such person underground in a mine”.

Further, diagnostic and curative services can be accessed through the normal healthcare delivery system.

The Namibian Labour Act of 1992 and the contained regulations relating to the health and safety of employees at work, govern occupational health and safety in the country. Labour inspectors, under the Ministry of Labour and Social Welfare, generally oversee the application of these regulations. The development of mining-related health and safety regulations within the Ministry of Mines and Energy is in progress but not yet promulgated or in force. Particular occupational health regulations are overseen by the ‘Chief Medical Officer of Occupational Health and Safety’ acting under the Ministry of Health and Social Services. The National Occupational Health Policy from 2006, in its annexure A, defines notifiable occupational diseases and works involving exposure to risk. Silicosis, asbestosis and silico-tuberculosis (provided that the silicosis is an essential factor for the tuberculosis), as well as bronchopulmonary diseases caused by dusts and irritants, fall under the notifiable diseases.

It is the responsibility of the employer to care for the health and safety of the employed workforce based on a risk profile to be established. Registered occupational medical practitioners are supposed to carry out pre-employment and periodic medical examinations based on that risk profile. Currently the Ministry of Health has registered a total of 26 occupational medical practitioners across the country (Dec 2016). The employer is to report on occupational injuries and diseases. However, a systematic reporting of occupational lung diseases to the Chief Medical Officer does not take place. The paper-based reports on injuries and diseases are not systematically analysed and statistical information on the burden of pneumoconiosis or silico-tuberculosis in the mining sector is not accessible. This is mostly related to the set-up of the inspectorate. The Chief Medical Officer in Occupational Health and Safety currently works alone. The two other inspector positions are vacant. The large mining houses have set up elaborate occupational health and safety systems paired with first aid and primary healthcare and apply the provisions made in the legislation and occupational health policy. Medium- size and small-scale mines provide occupational health services in collaboration with the registered occupational practitioners. In this mining segment, pre-employment and exit medical examinations usually take place, with period examinations carried out randomly. The mostly selfemployed artisanal mineworkers do not undergo occupational health screenings. Where mines do not provide primary healthcare services to mineworkers (medium and small- scale mines), the public healthcare system can be accessed for a low fee.

Zambia differs from Namibia and Botswana as the mandate for carrying out occupational health screening in the mining sector lies with the ‘Occupational Health and Safety Institute (OHSI)’ in Kitwe/ Copperbelt. The Institute is a regulatory body that was established under the Occupational Health and Safety Act No. 36 of 2010 and as such falls under the Ministry of Health. While the OHSI was formerly focussing on the mining sector and occupational lung diseases,

it is now conducting medical surveillance examinations for all industries, including occupational disease diagnostics and developing occupational health promotion and prevention programs. In terms of location and equipment, OHSI has clearly the technical capacity to provide the mentioned services and is selected to become a ‘Regional Centre of Excellence’ supported by the World Bank and WHO. The OHSI shares a campus with the Worker’s Compensation Fund and the Mine Safety Department, thus providing an ideal setting for comprehensive service delivery to the mining sector’s workforce. There are however limitations in terms of coverage. The sprawling sector activities, which are now covering the whole of Zambia, leave non-Copperbelt regions underserved. The Institute carries out mobile services in these areas and is preparing the expansion to two new locations, namely Solwezi and Lusaka.

Large mining houses in the country provide OHS at BOHS level IV but OH screening is only done at OHSI. The visited mining hospitals are state of the art facilities with quality prevention, health promotion, curative and rehabilitation services. A network of satellite clinics attends to patients on site and refers complicated cases to the large mine-owned hospital facilities. Smaller mines (medium- size mines) provide on-site PHC services and emergency care, at BOHS stages I or II. Major health problems are referred to services of the public health system, which are offered at no cost. In the Copperbelt, the 40 mining companies organise transport to the Kitwe OHSI for fitness-to-work examinations. In other regions of the country, mining houses rely on the mobile services provided by OHSI.



Due to transportation challenges, artisanal mineworkers rely mostly on primary health care services provided at rural health centres/posts, which are poorly resourced in terms of equipment and staff. In addition, the small-scale mines operate almost uncontrolled and workers do not undergo fitness-to-work examinations, as required.

The Department of Occupational Safety and Health Services under the DoL administers the Factories Act of 1964 and inspects the state of health and safety at all workplaces apart from mines. There are overlaps of competence with the Mine Safety Department and/or OHSI (e.g. when gold processing plants are not located on the mine's grounds), but generally the different actors have found ways to distribute tasks among themselves.

Tanzania, Mozambique, Zimbabwe

Tanzania's Occupational Health and Safety Authority (OSHA) was established under the Executive Agencies Act No. 30 of 1997 and is the custodian of the Occupational Health and Safety Act No. 5 of 2003. All workplaces in the country are supposed to register with OSHA. Once registered they must comply with occupational health and safety standards issued by the authority and undergo regular inspections. In the Performance audit report on the management of occupational health and safety in Tanzania, conducted by the Auditor General in 2013, it is pointed out that only a fraction of all workplaces has actually registered with OSHA, "Workplaces located in peripheral, rural, sub-urban areas and other regions far from OSHA zone offices face a risk of not being registered at all."³³ This is particular true for small-scale and artisanal mines.

The Authority is mandated to undertake occupational health surveillance for the country's entire workforce. Surveillance activities include pre-employment and periodic "fitness to work" examinations. Surveillance services are rendered at OSHA's premises in Dar es Salaam and through mobile teams visiting the workplaces. OSHA also outsources fitness-to-work examinations to private medical practitioners and health services (including mine on-site services). OSHA has issued a particular guideline, the Fitness-to-work medical examination guideline, which provides orientation to the contracted medical doctors and consistency of examinations. Large mining operations usually provide in-house occupational health surveillance, as well as emergency and primary health care services to their workforce equivalent to BOHS Level III or IV. These go as far as medically evacuating severely injured or ill workers via air ambulance services to hospitals in either Kenya or South Africa. Mediumscale mines should be registered with OSHA and should have services in line with BOHS Stage I/II. Many, particularly smaller medium-size mines, do not comply with OSHA criteria for compliance with regulations. Their mineworkers generally do not undergo regular "fitness to work" examinations. Health care in terms of primary care and/or the treatment of injuries and diseases takes place at public health facilities. The mine owners directly cover the costs or the company would pay into the National Health Insurance Fund (NHIF) and expect the fund to cover for the health care of the personnel.

Although periodic medical examinations are mandatory, the majority of mineworkers (particularly the estimated 750,000 artisanal mineworkers) are not covered by occupational health screening, nor are they provided with minimum services (primary health care) as defined in BOHS Stage I. Small-scale mining sites are scattered and far from any urban structure. Distances to the next urban centre can be 25 km and more, with rough roads and no public transport system in place. Sometimes a rural health post is the nearest health facility to these mining areas but does not provide diagnostic and treatment services for HIV or TB, let alone have any competencies in occupational health (silicosis, dust exposure assessments, etc.). Community health services, including outreach services, which would be an asset for TB detection and treatment, do not reach out to the informal housing areas where artisanal mineworkers lodge. The high degree of mobility of this population, who tend to look out for ever better prospects to find gold, makes it difficult to detect, refer, and follow-up on suspect cases and patients. A further common problem in small-scale/artisanal mining communities is the lack of health promotion and education⁵.

With regards to occupational diseases prevalent in mining, such as silicosis and tuberculosis, OSHA has clear capacity problems. The authority does not have an x-ray facility, neither at headquarters in Dares Salaam nor for the use of their mobile teams. Suspect cases (e.g. detected during lung function testing) are referred to public or private hospital facilities for an x-ray.

Since there is no trained (occupational health) physician in the country who is certified to diagnose silicosis (the country's only OH medicine specialist has retired), it is most unlikely that pneumoconiosis cases are detected at all. This may further explain the weak information on pneumoconiosis cases in the country. Tanzania has established a collaboration with WHO and is currently working on models of providing integrated occupational health services within a PHC setting.

³³ UR of Tanzania National Audit Office (2013): A performance audit report on the management of occupational health and safety in Tanzania.



In Zimbabwe, the Statutory Instrument (SI) 68 of 1990; Act /89 provides the framework for OHS delivery in the workplace. It identifies the National Social Security Authority (NSSA) as the administrator of the compensation fund.³⁴ NSSA has an established Medical Bureau that issues certificates of fitness (pre- employment) and validates periodic examination results submitted by any Medical Doctor in the country. Occupational health surveillance in terms of fitness to work examinations is mandatory in all workplaces in the country. The respective examinations are carried out either by health facilities (e.g. District Hospitals), private practitioners, or mine health facilities (in the mining sector). No qualification is required, but NSSA offers a 5-day OHS training course for physicians conducting the examinations. The results of periodic examinations are forwarded to the NSSA Medical Bureau that issues certificates of fitness and validates periodic examinations. The Medical Bureau has recently acquired a mobile unit to target hard-to-reach mining populations with periodic occupational examinations. The mobile unit has diagnostics such as spirometry, x-ray, vision tests, etc. The frequency of periodic examinations of mineworkers varies; usually a first examination takes place after five years of employment, depending on the individual's health status, age, and job.

Afterwards examinations are carried out on a yearly basis. It is a concern that no medical examinations are offered to ex-mineworkers. Pneumoconiosis or any other occupational disease must be immediately notified. TB is not mentioned as a specific compensable disease in legislation. Given the fact that there are very few trained occupational medicine specialists in the country, underreporting is very likely.

Large mining houses in the country provide OHS at BOHS levels III or IV. The visited mining hospitals are state-of-the-art facilities with quality prevention, health promotion, curative and rehabilitative services. A network of site clinics sees patients on site and refers complicated cases to the large mine-owned hospital facilities. Some of these hospitals cater also for small or medium- size mines on a contract base. Medium- sized mines provide on-site services of BOHS level I or II and refer patients with injuries or diseases to the next public hospital.

Small, and particularly artisanal mines, are insufficiently integrated into the occupational health system. As in Tanzania, these mineworkers are self-employed contractors who are paid a commission on production and are not counted as employees who are required to undergo any routine medical check-ups. They often live and work far away from any kind of health and social infrastructure and would primarily use public health services in the case of severe injuries or diseases.

These are neither equipped nor is the personnel skilled to diagnose occupational diseases. According to Mozambique's Government Decree n." 61/2006, a mine employee shall be subjected to a medical examination aimed at determining his physical and psychological suitability for the work.

Employees performing activities in dusty environments, and who are susceptible to getting pneumoconiosis, shall undergo medical examinations each year.³⁵ The regulatory framework provides for yearly medical examinations, or even biannual medical check-ups for miners working in areas of risk.³⁶ Large mining houses cater for these examinations. It is unclear how the application of the regulation is managed at medium and small-scale mines, including artisanal mines.

³⁴ <http://www.nssa.org.zw/index.php/2012-07-16-09-03-04> 37

³⁵ Article 285, Decree n." 61/2006, Regulations on technical safety and health for geological and mining activities

³⁶ Decree n." 13/2015, New Decree on the regulation of Mining Work

The Ministry of Health (Ministério da Saúde), under its Directorate of Medical Assistance, has established an occupational health unit with two health inspectors, which should oversee compliance with the provisions. They admitted that regulations are not adhered to by small-scale and artisanal small-scale mining operations and mineworkers are not screened for occupational diseases or receive adequate health services when in need.

Mozambique has established a Labour Advisory Committee (Comissão Consultiva do Trabalho-CCT). The Committee is a tripartite structure for social consultation which has the functions to propose measures and develop policies on OSH matters. The Labour Advisory Committee is chaired by the Minister of Labour and composed by the members of the Government responsible for various sectors of economic activity and representatives of employers and employee associations. However, during interviews it was mentioned that this tripartite structure is not operational.

In mining undertakings, there is an obligation to establish joint occupational safety commissions (OSH committee) when 200 workers or more are employed, and in those undertakings which present exceptional risks of occupational accidents. In the mining sector, the joint occupational safety commission also has the purpose, among others, to perform periodic inspections of facilities and equipment, consider the suggestions of workers, provide training and request the support of technicians and experts. Small and medium-scale mining do not have such committees or representation.



Lesotho, Swaziland, Malawi

In Lesotho OHS is regulated in the Labour Code Order of 1992. The Ministry of Labour administers the Labour Code Order and a 'National Advisory Council for Occupational Safety, Health and Welfare' advises the Ministry of Labour on matters that need regulation. Part VII of the Labour Code Order places the responsibility for a safe work environment on the employer ('...providing and maintaining a working environment that is clean, safe, without risks to health'). It requires (Labour Code Section 97/98) the appointment of registered health and safety officer in enterprises with more than 100 employees and the establishment of a health and safety committee in enterprises with more than 15 employees. Labour Code Section 102 refers to the notification of industrial diseases including tuberculosis, pneumoconiosis, silicosis etc. It provides for the reporting of occupational death, injuries and diseases and makes provisions for medical screening of employees being in contact with toxic substances. These do not include crystalline silica dust (Schedule 7 of the Labour Code Order). Respectively, there are no statistics on silica-dust related occupational disease prevalence and incidence rates. Although the legislation is not explicit on the question of medical screening of mineworkers, the large mining houses test the fitness for work of their employees, including lung function testing and x-rays.



Most large mines have in-house medical services but do not report on occupational diseases or dust levels to any ministry. As per legislation, a registered medical practitioner shall conduct medical examinations and testify the fitness of the employee where required. Currently there is only one independent occupational and public health specialist in the country, based at Queen Elizabeth II Hospital in Maseru. The specialist performs occupational disease diagnosis and submission for compensation for all Lesotho employees. On average, there are ten occupational medical examinations conducted per day, mainly for workers from textile and diamond mines. Small-scale mines and quarries do not offer any medical screening to their employees. It was reported by small scale mining associations and inspectors that mineworkers in this mining segment are usually contracted for very short time periods, sometimes only on a day-to-day basis. The Labour Inspectors do not place importance on health-related matters during inspections; they focus on broader compliance with labour regulations within the mining industry. Health Inspectors under the Ministry of Health do not have the competence nor the resources to carry out occupational health inspections and are primarily occupied with community health questions.

Swaziland's 'Occupational Health and Safety Act 9 of 2001 (OHS Act) Section 9. (1)' provides for an employer or an occupier to ensure the safety and health of all employees during employment by securing safe and healthy working conditions. In PART VI it further calls for the notification and investigation of occupational accidents and diseases, which includes notifications and actions under sections 32 and 33, specifically aimed at occupational diseases. Prior to employment each employee must undergo a fitness to work assessment. These are mostly carried out by private general practitioners and not by occupational health specialists. Periodic examinations are carried out every two years. In 2015, there were 7 compensation claims for occupational diseases, which included claims for silicosis, pneumoconiosis and noise induced hearing loss. Occupational health inspections are carried out in a more general nature, with no capability of conducting any occupational hygiene measurements or evaluations. Inspectors are required to cover all types of industries, which presents a challenge in that certain industries have quite specific and unique conditions, emissions and exposures to deal with. The 'Ministry of Labour, Youth, Sports and Manpower Development' in Malawi administers the 'Occupational Safety, Health and Welfare Act of 1997 (OSHW)'. The 'Directorate for Occupational Health and Safety' is charged with responsibility for prevention, recording, investigating and reporting occupational health injuries and diseases. According to section 34 OSHW Act the Director for OSH should request risk-related medical examination at employment or at intervals. This is not generally complied with so there is no culture of; initial, periodical and exit medical examinations being conducted. The Directorate is not mandated to run or regulate occupational health services.

Employees requiring medical examination are referred to primary care providers, who usually have neither the skills nor the equipment to undertake occupational health examinations. There are no facilities that are dedicated to the examination and surveillance of workers. Employers are expected to record all work-related injuries and illnesses in the General Labour Register (OSHW Act). The second schedule of the OSHW Act lists compensable and reportable occupational diseases. The diseases listed include silicosis and asbestosis (OSHW Act 1997 section 67 and 67s). Tuberculosis is to be reported within the context of the public health system but not listed as a compensable occupational disease. There is no central database to record injuries or occupational diseases, it is in the process of being developed. It is also assumed that there is under-reporting of injuries, accidents and occupational diseases due to the lack of systematic screening and the low awareness about occupational diseases in general. The Ministry of Health's environmental health department, under the Directorate of Preventive Services, is mandated to carry out surveillance of workers' health and the working environment. First aid boxes are mandatory in every workplace while onsite clinics are to be prescribed by the Minister but no such regulations have ever been made. Within the context of an EU funded project, Malawi has established a National Occupational Health Programme (2011 – 2016), however there seems little progress in comparison to the ambitious objectives laid out in the programme, particularly in the field of legislative reforms and the capacitation of inspectorates. Table 9 below provides an overview of the legal provisions for OH screening within the mining sector.

Table 9: Overview on legal provisions on occupational health screening within the mining industry

| Country | Legislation | Provisions for occupational health screening | | | |
|---------------------|--|--|--|----------------------|---|
| | | Fitness for work/ preemployment examinations | Periodic OH examinations including TB screening | Exit examinations | Systematic periodic examinations of ex-mineworkers |
| Botswana | Mines, Quarries, Works and Machinery Act (CAP44:02 of 1978) | Yes | No | | No |
| Lesotho | Labour Code of 1992 | Yes / No* | Yes / No* | No | No |
| Malawi | Occupational Safety, Health and Welfare Act of 1997 | No | No | No | No |
| Mozambique | Decree n."13/2006, New Decree on the Regulation of Mining Work | Yes | Yes | Yes | No |
| Namibia | Labour Act, 1992: Regulations relating to the health and safety of employees at work | Yes | Yes | | |
| South Africa | Mine Health and Safety Act of 1996; DMR guideline for compilation of a mandatory COP; Draft minimum standard to perform work on a mine | Yes | Yes | Yes | Yes |
| Swaziland | Occupational Health and Safety Act 9 of 2001 | Yes | Yes | No | No |
| Tanzania | Occupational Health and Safety Act No. 5 of 2003 | Yes | Yes | Yes | No |
| Zambia | Occupational Health and Safety Act, No. 36 of 2010, The Factories Act of 1964 | Yes | Yes | Yes | Yes |
| Zimbabwe | Pneumoconiosis Act of 1996, Part V | Yes | Yes | Yes | No |

* Provisions made for several toxic substances that would require regular health screening of exposed employees including asbestos, but not for crystalline silica dust.



3.5. Compensation of occupational lung diseases

South Africa

South Africa's Department of Health (DoH) administers the Occupational Diseases in Mines and Works Act (ODMWA) of 1973, which provides for the medical surveillance and compensation of lung and heart diseases contracted in controlled mines and works. The regulator is the Compensation Commissioner for Occupational Diseases (CCOD). The Medical Bureau for Occupational Diseases (MBOD) of the DoH provides benefit medical examinations (BME) for workers and processes exmineworker claims conducted at other sites such as at the One Stop Services Centres (OSSCs). In South Africa TB is compensable even in the absence of silicosis in terms of ODMWA, if a miner has worked more than 200 risk shifts and the TB is diagnosed whilst at work (after working the 200 risk shifts) or within 12 months of leaving such risk work.

The Department of Labour (DoL) administers the Compensation for Occupational Injuries and Diseases Act (COIDA) of 1993, which covers most sectors of the economy other than informal workers and those under ODMWA. The primary agency responsible for regulating work-related accidents and diseases for workers employed in the formal sector (except mining) is the Chief Directorate Occupational Health and Safety in the DoL. It provides a no-fault compensation system for employees who are injured in accidents or who sustain occupational diseases arising out of and in the course of their employment. All employers are obliged to register with a "carrier", which is either the Compensation Commissioner of the Compensation Fund or an approved designated mutual. Employers are then required to provide their respective carrier with the particulars of their businesses and failure to register with a compensation fund constitutes an offence.

South Africa is establishing a unified dispensation for compensation and medical care for workers with occupational injuries and diseases, which is expected to realise equity in benefits and care and an enhanced administrative system. In December 2015, the Minister of Health in collaboration with the Ministers of Labour and Mineral Resources, supported by their respective Deputy Ministers, committed to establishing that unified dispensation for an integrated compensation system.

Although legislation and systems are in place, South Africa has not been reaching out and compensating occupational lung diseases as many ex-mineworkers have either migrated to the mining areas from rural South Africa or neighbouring countries. Although ex-mineworkers have a legal right to a medical benefit examination every two years, most are lost to follow up. The compensation commissioner has now taken action and tries to rectify this situation. Firstly, the MBOD, under the Department of Health, has responded by developing an electronic database containing information on current and ex-mineworkers in the so-called controlled mines and works (246) falling under the responsibility of the CCOD/MBOD. It allows the active tracking and tracing of mineworkers and will facilitate communication and compensation in the future.

Secondly, the MBOD has set up decentralised structures, where benefit medical examinations (BMEs) are performed on exmineworkers. There are two models of decentralisation, (a) the setting up of so-called occupational health one-stop service centres (OSSCs) and (b) the contracting of private practitioners and provincial health facilities to perform BMEs. Thirdly, the CCOD has appointed several occupational health doctors to the Certification Committees to tackle the backlog of claimant files to speed up compensation.



Botswana, Namibia, Zambia

The Botswana 'Workers Compensation Act' provides for the compensation of workers for injuries suffered or occupational diseases contracted during their employment or for death resulting from such injuries or diseases. Each employer is expected to take out insurance to cover the total costs of occupational injuries and diseases. However, applications for compensation are submitted to the District Labour Offices, providing oversight to make sure compensation payments are made to an employee. In this Botswana has a decentralized compensation process and structures at regional and district levels, with compensation being awarded at these levels. Disputes are referred into the Compensation Commissioners Office at national level, and if necessary brought to the attention of a Medical Board. The latter is comprised of three medical doctors, one attorney; and one person qualified and experienced in a labour-related profession. The function of the Medical Board is to adjudicate on medical disputes with regards to incapacity and other medical questions in relation to any claim for compensation.

Silico-Tuberculosis is compensable under Schedule 2 of the Act, provided there is evidence of silica dust exposure. There is a sense of security however that no pneumoconiosis emanates from Botswana mines, and that it is clearly a "South African" induced problem³⁷. A pneumoconiosis screening unit under the auspices of the Occupational Health unit in the Ministry of Health, was established in 1999. It has a database of approximately 5,000 Botswana mine workers having worked in South African mines, and screens about 200-300 former mine workers per year³⁸. According to the Ministry of Labour there are no cases of silicosis other than the ones in ex-mineworkers having worked in South African mines. No research has been done in the field to support this statement.

The Namibia 'Employee Compensation Act, 1941' (amended 1995), provides for employees' compensation insurance on a collective liability basis and is administered by the Social Security Commission. Under the

Act every employer who employs one or more employees is required to complete a form of registration and to pay annual assessments to the Accident Fund established in terms of section 64 of the Act. The Commission is the Trustee of the Accident Fund. All compensation benefit costs, as well as the costs of administration of the Act, are paid from the Accident Fund, and the Commission determines all claims and decides on all matters falling within the scope of the Act.

Compensation is paid in respect of temporary disablement, permanent disablement and death. Medical expenses that are deemed within reason are payable within a 2-year period or longer if required. TB is compensable for mineworkers and notifiable to the Social Security Commission. There is a Chief Medical Officer for Occupational Health in the Ministry of Health who registers statistics specific to occupational health in mines, however there is a lack of robust statistics of occupational lung diseases. This could be due to under reporting to the Social Security Commission and the Ministry of Health and Social Services but also there are no electronic systems in place to collate and analyse the data. Reports show that between 2004-2005 only 6 occupational diseases were diagnosed and reported in Namibia and TB ranked second on the list³⁹.

Zambia's *Workers Compensation Act (10) 1999* was promulgated to revise the law relating to the compensation of workers for disabilities suffered or diseases contracted during employment. This Act provides for compensation of TB and pneumoconiosis of all employees, but not for any other occupational disease⁸. It provides for the medical examination and certifications of fitness to work on a mine. It also provides for the payment of compensation to dependants of workers who die because of accidents or diseases. Importantly, it provided for the merger of the functions of the *Workers' Compensation Fund Control Board* and the *Pneumoconiosis Compensation Fund*. It also provides for the appointment and powers of a *Workers' Compensation Commissioner*. The *Ministry of Labour and Social Security* administers the *Workers Compensation Act (No. 10 of 1999)*. The Act specifies that a *Workers' Compensation Fund Board (WCFB)* and a *Workers Compensation Tribunal* be established to manage the compensation fund. In administering the Act the WCFB receives notices of accidents and claims for compensation, and inquiries into the cause of the injury or disease. Employees are expected to submit a claim within three days of gaining knowledge of the incident. Further, the WCFB collects, compiles and maintains statistics and information relating to the occurrence or cause of accidents and diseases and keeps a schedule of diseases.

The WCFB compensation benefits include:

- Periodical payments – made to an employer for sustaining an employee on a salary during hospitalisation, up to eighteen months
- Medical refunds – all expenses incurred relating to the treatment are refunded at 100%
- Lump sum payments – granted to workers who suffer disability and less than or equal to 10%
- Life pension – is granted for disabilities assessed between 11 – 100%
- Survivors benefits – are paid to the dependants, spouses and children of deceased workers
- Vocational training and rehabilitation

³⁷ Key informant interview. Department of Labour, 20 October 2016

³⁸ Key informant interview. Occupational Health Unit, Ministry of Health, 19 October 2016.

³⁹ Ministry of Health and Social Services (2011): Occupational health services in Namibia. Slide show received from Chief Medical Officer Occupational Health

Employers in both the private and public sectors are expected to make financial contributions into the fund. However, the Auditor General (2015), noted that there were 18,295 companies registered for compensation in 2013, and only 49% comply in paying compensation assessment fees.

The Fund has established an injury and illness programme, at no cost to the employer, aimed at proactively supporting employers to “find and fix workplace hazards before workers are hurt”. The Fund, in responding to a worker centric approach, has embarked on an aggressive Rehabilitation and Return to Work Programme. The focuses on enabling injured (or ill) workers to be “reintegrated in gainful and sustainable employment” as early as possible.

Although ex-mineworkers have the right to medical benefit examinations, they often get lost to follow up when retiring and retreating to rural areas.

Tanzania, Mozambique, Zimbabwe

Although Tanzania’s Workmen’s Compensation Act was enacted in 2008, the actual Workmen Compensation Fund was only established in 2015 and became operational in July 2016. The Fund covers:

- Expenses for medical aid in the context of occupational injuries and diseases
- Compensation payments for temporary disablement and rehabilitation
- Compensation payments for permanent disablement (up to 70% of former earnings)
- Survivor’s benefits (spouse 40%, Children 20%)
- Assistance grants when needed

It is planned that physicians in health facilities across the country certify an occupational disease or injury. The Public Health School of Muhimbili University currently trains respective medical cadres in short courses. In the short term, three physicians per district shall be trained and accredited to undertake the certification function. It is further envisioned that the fund will contract particular health and rehabilitation facilities to provide medical aid and rehabilitation services. The workmen compensation fund supports rehabilitation interventions based on an assessment and a respective rehabilitation plan (§70 of the Workmen’s Compensation Act). There is no mandatory health screening of ex-mineworkers enacted. An occupational health specialist of OSHA suggested that it is very unlikely that pneumoconiosis cases related to silica dust exposures have ever been compensated, when the disease manifested after active mine work. Mineworkers are lost to follow up after retiring from mine work and OSHA does not have a strategy on how to screen ex-mineworkers for occupational diseases.

Mozambique

The ‘Labour Law n°. 23/2007’ and the regulation ‘Legal Regime of Accidents at Work and Occupational Diseases (Decree n°. 62/2013)’ of Mozambique obliges the employer to transfer to an insurance company the responsibility for damage arising from occupational accidents and diseases of their employees and apprentices. The law provides for compensation for disability (temporary and / or permanent), absolute or partial, to the job that is allocated to the employee and if dead to his family. Furthermore, in the case of an occupational accident or disease, it is the employer’s obligation to transfer the injured worker to a job consistent with the worker’s residual capacity. In case it is impossible to transfer the injured employee to a job consistent with his/her residual capacity, the employer may terminate the employment agreement. However, in this case, the employer should provide compensation to the worker corresponding to the value of 45 working days multiplied by the number of years the worker was employed⁴⁰ (LEGOSH, 2014). Diseases caused by industrial dust, gases and vapours are compensable including asbestos dust and asbestos fibres. TB is not compensable.

The Zimbabwe National Social Security Authority Act makes provision for the establishment of social security schemes for the provision of benefits for employees⁴¹. The Act further entails promoting awareness, health and safety at all workplaces, and encouraging the implementation of health and safety regulations.

According to provisions in the Act, all employers except government, domestic workers and informal sector employers, are to contribute to the scheme for their employees. The aim of the scheme is to provide assistance to employees and their families when workers are injured or killed in a work- related accident, or suffers from a work- related disease, or dies as a result of this disease. TB is not mentioned as a compensable disease.

The scheme provides for rehabilitation services to disabled employees to reduce their disablement and enable them to return to their former employment, or otherwise prepare them for a useful and meaningful place in society.

Benefits of the scheme include:

- Periodical Payments in Respect of Loss of Earnings: Provide compensatory income where this has been lost or stopped by work- related accidents. Guarantee continual payment of normal monthly wages for the first 30 days following an accident, and a percentage thereof thereafter.

⁴⁰ Decree n.° 62/2013, Decree on Legal Regime of Accidents at Work and Occupational Disease

⁴¹ <http://www.nssa.org.zw/index.php/2012-07-16-09-03-04>

- **Funeral Grant:** In the unfortunate event of a member losing his/her life because of a workrelated accident, the scheme currently pays out a maximum of US\$200 towards funeral expenses.
- If an employee's injury results in permanent disablement, compensation will be paid to him/her as a lump sum if the disability is less than 30%. A children's allowance for children up to the age of 19 years is included.
- **Employees' Pension:** In instances where an employee's injury results in 30% or more, permanent disability, compensation will be paid to the employee as a pension. A children's allowance is included in employee's pension, for children up to the age of 19 years and /or those who are below 25 years, provided they are in fulltime education. The benefit may also be given to permanently disabled dependent children who are incapable of supporting themselves regardless of their age.



Lesotho, Swaziland, Malawi

Lesotho's Workmen's Compensation (Amendment) Act 1993 (No. 3 of 1993) empowers the Minister to prescribe by regulation compensation for burial of deceased workmen, permanent total incapacity and medical expenses.

The Workmen's Compensation Regulations, 2014 provide for:

- Compensation in fatal cases
- Compensation in case of permanent total incapacity
- Compensation in case of a permanent partial incapability
- Medical expenses in respect of medical, surgical and hospital treatment, skilled nursing services and the supply of medicines.

According to the First Schedule of the Workmen's Compensation Act, TB is compensable: '... pneumoconiosis caused by seleragenetic mineral dust (silicosis, anthracosilicosis, asbestosis) and silicotuberculosis, provided that silicosis is an essential factor in causing the resultant incapacity or death.' However, there is no database on occupational lung diseases emanating from mines in Lesotho. In 2013, a precedent setting case of compensable TB was diagnosed in Lesotho. The case was compensated for work aggravation of TB in a construction worker; no silica dust exposure was documented. In terms of the compensation processes, any submission for occupational disease compensation must go via the occupational health unit at Queen Elizabeth II Hospital. This practice places tremendous strain on a "poorly resourced system", as reported by the occupational medical practitioner. It was further elaborated that basic lung function testing equipment is either not available or where available, it is poorly maintained.

The Swaziland Workman's Compensation Act (1983) provides for the compensation and medical treatment of workers who are injured or may have contracted an occupational disease and it makes provision for all employers and to every employee employed inside or outside Swaziland by such an employer unless that employee is covered by the national social protection programme of that other country. Over the past years, many Swazi men worked in South African mines and when they became ex-mineworkers and returned to Swaziland, are still covered for compensation by the South African Occupational Diseases and Mine Works Act and COIDA.

Part IV speaks to compensation relating to occupational diseases specifically: Section 42 more specifically to Pneumoconiosis (... or from pneumoconiosis accompanied by tuberculosis" ...). The Act talks about a scheme that should be set up to compensate employees who have suffered death or total disablement from pneumoconiosis or from pneumoconiosis accompanied by TB. Also, compensation should be made available to those who may not be totalled disabled but suffer from pneumoconiosis or from pneumoconiosis accompanied by TB. The Act makes provision for the medical board appointment and their salaries and for workmen to present themselves for periodic assessments. According to the Act, if someone is found to have pneumoconiosis with or without TB, they may be excluded from work in a particular industry. The Ministry of Labour and Social Security administers the Workmen's compensation.



The Malawi Worker’s Compensation Act No. 7 of 2000 makes provision for compensation for injuries suffered or diseases contracted by workers during their employment or for death resulting from such injuries or diseases. It provides for the establishment and administration of the Workers’ Compensation Fund, which has not yet materialised. Pneumoconiosis, and particularly silicosis, fall under the compensable scheduled diseases. Tuberculosis is only compensable when contracted in a high-risk healthcare or laboratory setting. A person eligible for compensation will be referred to the Ministry of Labour, Youth and Manpower Development for evaluation. The degree and amount of compensation will be calculated and agreed upon with the employer. The employer then affects the compensation payment. It is envisaged to revise the current system and introduce a risk-based levy payment into a Compensation Fund.

Table 10: Overview on compensation schemes in study countries

| Country | Legislation | Social protection schemes | Coverage of pneumoconiosis and tuberculosis |
|----------|--|--|--|
| Botswana | Worker’s Compensation Act | Employer liability principle: Provides for the compensation of workers for injuries suffered or occupational diseases contracted during their employment or for death resulting from such injuries or diseases. Each employer is expected to take out insurance to cover the total costs of occupational injuries and diseases. Applications for compensation are submitted to the District Labour Offices, taking a lead role in ensuring compensation payments are made to an employee. | Pneumoconiosis, TB is not compensable in the absence of a diagnosis of silicosis. |
| Lesotho | Workman’s Compensation Act 13 of 1977 (and its amendments) | Employer liability principle: Relates to injuries and death of workmen suffered during their duties. Each employer is expected to take out insurance. | Act defines industrial diseases that are compensable when diagnosed by a medical practitioner. Compensable diseases include pneumoconiosis (silicosis, anthracosilicosis, asbestosis) and silicotuberculosis, provided that silicosis is an essential factor causing TB. |
| Malawi | Worker’s Compensation Act of 2002 | Employer liability principle: A person assumed to be eligible for compensation will be referred to the Ministry of Labour, Youth and Manpower Development for evaluation. The degree and amount of compensation will be calculated and the employer will be responsible for a once off payment. Should an employer not exist by the time of this compensation award, such an employee will not have recourse to any compensation. It is envisaged to have a risk-based levy \ payment done by employers soon, as the compensation programme is currently under review. | Pneumoconiosis, tuberculosis is not listed as a compensable disease. |

| | | | |
|----------------------------|--|--|--|
| <p>Mozambique</p> | <p>Labour Law n°. 23/2007 and the Regulation Legal Regime of Accidents at Work and Occupational Diseases (Decree n°. 62/2013)</p> | <p>Employer liability principle: Each employer is expected to take out insurance to cover the total costs of occupational injuries and diseases. The law provides for compensation for disability (temporary and / or permanent) absolute or partial to the job that is allocated to the employee and, if dead, to his family ^{42,43}. Furthermore, in case of occupational accidents or disease it is the employer's obligation to transfer the injured worker to a job consistent with the worker's residual capacity. In case it is impossible to transfer the injured employee to a job consistent with his/her residual capacity, the employer may terminate the employment agreement. However, in this case, the employer should give a compensation to the worker corresponding to the value of ⁴³ working days multiplied by the number of years the worker was employed ⁴⁴.</p> | <p>Diseases caused by industrial dust, gases and vapours are compensable including asbestos dust and asbestos fibre. TB is not compensable in mineworkers.</p> |
| <p>Namibia</p> | <p>Employee Compensation Amendment Act of 1995</p> | <p>Social insurance scheme: Employees' compensation insurance administered by the Social Security Commission being a trustee of the Accident Fund. Under the Act every employer is required to register and pay annual assessments to the Accident Fund.</p> | <p>Pneumoconiosis, silico tuberculosis, TB when silicosis is essential for contracting TB</p> |
| <p>South Africa</p> | <p>Occupational Diseases in Mines and Works Act (ODMWA) of 1973 Compensation for Occupational Injuries and Diseases Act (COIDA) of 1993</p> | <p>Social insurance schemes: (a) The mining industry pays a levy for the compensation of occupational heart and lung diseases into the Fund administered by the Compensation Commissioner for Occupational Diseases (CCOD). The Medical Bureau for Occupational Diseases (MBOD) certifies compensable diseases and the CCOD makes once off payments depending on the disease. (b) The mining industry pays a levy for the compensation of occupational injuries to a private insurer (Rand Mutual) who pays for medical services and rehabilitation and a pension case of partial or full disablement.</p> | <p>Pneumoconiosis, silico-tuberculosis and tuberculosis compensable.</p> |
| <p>Swaziland</p> | <p>Workman's Compensation Act – Act 7 of 1983</p> | <p>Employer liability principle: Labour Commissioner approves the terms the employer and the workman agree on in terms of compensation.</p> | <p>Pneumoconiosis and silico-tuberculosis compensable.</p> |

⁴² Decree n.° 62/2013 of December 4, Decree on Legal Regime of Accidents at Work and Occupational Disease

⁴³ Law n.°23/2007, Labour Law

⁴⁴ Decree n.° 62/2013, , Decree on Legal Regime of Accidents at Work and Occupational Disease

| | | | |
|-----------------|--|---|---|
| Tanzania | The Workmen's Compensation Act from 2008 | Since recently social insurance scheme: Makes provisions for compensation of injuries, diseases or death arising during employment. The Workmen Compensation Fund has been established in 2015 and will only be operational to administer the Act by the end of 2016. | Pneumoconiosis, silico-tuberculosis is compensable. |
| Zambia | The Workers Compensation Act (10) 1999 | Social insurance scheme: Employers in both the private and public sectors make financial contributions into the fund. | Provides for compensation of TB and pneumoconiosis in mineworkers. |
| Zimbabwe | National Social Security Authority Act and Accident Prevention and Worker's Compensation Notice (Statutory Instrument 68 of 1990) | Social insurance scheme: employers except government, domestic workers and informal sector employers are to contribute to the Accident Prevention and Workers Compensation Insurance Fund for their employees. | Pneumoconiosis, tuberculosis only if evidenced that the disease was contracted at the workplace |

3.6. Research and Innovation

It is critical that occupational health and safety systems produce complete and valid data for the analysis of the national workforce's health. Well-functioning occupational disease surveillance and notification systems provide the relevant authorities with incidence and prevalence data, which allow for the development of policies and strategies to improve worker's health. Chapter 3.4. describes the weaknesses of occupational health surveillance systems in study countries. In the following section the laws and regulations governing the notification of occupational diseases are reviewed.

South Africa

In South Africa reporting on mining occupational health indicators is conducted according to the DMR 164 Reporting on HIV and TB⁴⁵ and the DMR 165⁴⁶ and annual medical reports are submitted to the DMR.

Botswana, Namibia, Zambia

Botswana's Workmen's Compensation Act offers a framework for the compensation of accidents and occupational diseases. Under this act, reporting of accidents arising out of and during employment that lead to permanent disablement or sickness-related absences exceeding 3 days are required to be reported within 17 days. It is however assumed that for occupational health diseases such as pneumoconiosis, underreporting is common because medical practitioners across the country are not sufficiently familiar with diagnosing occupational diseases or with the correct reporting mechanisms.

While Zambia's Occupational Health and Safety Bill does not speak to the reporting of occupational diseases, the Factories Act of 1964 makes the following provisions under section (78): (1) Written notice of every case of any disease specified in the Second Schedule occurring in a factory shall forthwith be sent by the occupier to an inspector in the prescribed form; and the provisions of this Act with respect to the notification of accidents shall apply to any such case in like manner as to any such accident as is mentioned in those provisions; and (2) Every medical practitioner who attends any patient whom he believes to be suffering from any disease specified in the Second Schedule contracted as a result of his employment in a factory shall forthwith report the matter to an inspector, and shall be entitled in respect of every report sent in pursuance of this section to a fee of four fee units. However, as stated by the Director of the Occupational Health and Safety Institute in Kitwe, it is believed that medical practitioners across the country lack the competence to correctly diagnose an occupational disease, particularly pneumoconiosis and misdiagnosis and underreporting is likely. The Ministry of Labour and Social Services administering the Factories' Act keeps statistics on accidents, not on occupational diseases. These fall under the competence of the latter Institute. Statistics at the Institute are derived from periodic medical examinations.

⁴⁵DMR 164. Reporting on HIV and TB. Online: www.dmr.gov.za/publications/viewdownload/113-forms/933-dmr164reportingonhivandt.html

⁴⁶DMR 165. Annual Medical Report. Online: <http://www.dmr.gov.za/annual-medical-report-form/summary/84-occupational-medicine/752-formannualmedicalreport.html>



Tanzania, Mozambique, Zimbabwe

The Tanzania Occupational Health and Safety Act of 2003 provides under section 101 (2) that, 'any medical practitioner who examines or treats a person for a disease which he believes to be an occupational disease or any other disease which he believes arose out of that person's employment, shall within fourteen days from the day of examination or treatment and in the prescribed manner, report the case to the employer of that person and to the Chief Inspector.' However, the knowledge about occupational diseases and particularly occupational lung diseases is almost non-existent and respective diagnoses and reporting is not happening. There is currently only one occupational health specialist (retired) in the country, who is certified to diagnose a pneumoconiosis.

According to Mozambique's Decree n.º 61/2006law, mining permit holders or mining operators shall send a monthly report on the accidents that occurred to the Inspector General of Mineral Resources. In practice, this is not happening. Additionally, an annual report shall contain statistics on the accidents that occurred, with an indication of the number of fatalities, as well as information on occupational diseases⁴⁷. While accident reporting is common in large and medium-sized mines, occupational diseases are less likely to be evaluated as such and reported. Reporting is not practiced in small-scale and artisanal mines and not enforced either.

Zimbabwe's Accident Prevention and Worker's Compensation Scheme requires employers in terms of Statutory Instrument 68 of 1990 Section 47 to report an accident of a worker within 14 days of gaining knowledge of such work-related accident. It does not speak to the reporting of occupational diseases. The Factories and Works Act: Chapter 14:08. of 1948 in its part IV requires that medical practitioners who attend to workers suffering from lead, phosphorous, arsenic, mercury poisoning or anthrax, because of occupational exposures, report to the inspector. There is no mention of the reporting of pneumoconiosis or work-related tuberculosis under this Act or under the country's Pneumoconiosis Act of 1996.

Lesotho, Malawi, Swaziland

In Lesotho, Labour Code Section 102 refers to the notification of industrial diseases including tuberculosis, pneumoconiosis, silicosis etc. Although the labour code prescribes reporting of occupational death, injuries and diseases, it does not make provisions for medical surveillance of the workforce in terms of fitness for work examinations, periodic examinations or exit examinations; thus valid statistics on occupational diseases are not available.

The Malawi Occupational Safety, Health and Welfare Act of 1997 provides in its Part IV for medical practitioners to '... upon examination of any person in accordance with this section, is of the opinion that such person is suffering from effects of any dangerous substance contracted as a result of his employment in a workplace or whilst engaged on structural work, shall report the matter in writing to the Director.'

Swaziland's Occupational Safety and Health Act of 2001 in its section 32 (1) provides that, 'if any person who works or has worked in any workplace is certified by a medical practitioner to be suffering from an industrial disease which appears to be due to the nature of that person's employment or activity, the employer concerned shall notify an inspector thereof and in the prescribed form unless the industrial disease has been or is being notified under the Workmen's Compensation Act No. 7 of 1983.'

In all three countries, the knowledge about occupational diseases and particularly occupational lung diseases across the health sector, is almost non-existent and respective diagnosis and reporting is not happening. Likewise, reliable statistics are not available. Table 11 below gives an overview of the surveillance of occupational lung diseases in each country.

⁴⁷ Article 14 Decree n.º 61/2006, Regulations on technical safety and health for geological and mining activities

Table 11: Overview on status of surveillance of occupational lung diseases

| Country | Reporting of occupational diseases per legislation | Actual statistics on occupational lung diseases | Record keeping of personal lifetime exposures |
|--------------|--|---|---|
| Botswana | Yes | No | No |
| Lesotho | Yes | No | No |
| Malawi | Yes | No | No |
| Mozambique | Yes | No | No |
| Namibia | Yes | No current information | Yes |
| South Africa | Yes | Yes | Yes |
| Swaziland | Yes | No | No |
| Tanzania | Yes | No | No |
| Zambia | Yes | Yes | No |
| Zimbabwe | Yes | No | No |

4. CONCLUSIONS AND RECOMMENDATIONS

4.1. Bold policies and supportive systems

4.1.1. Regional harmonisation of legislative frameworks

The SADC “Protocol on Mining” strives for the harmonisation of policies and procedures for mineral extraction in the mining sectors of member states as well as for increased regional cooperation to improve technical capacity and knowledge sharing. The ratification status of ILO conventions suggests that there is little harmonization in the field of labour laws. Even ILO Convention C155, which is highlighted in Article 12 of the Charter of Fundamental Rights in SADC has only been ratified by South Africa, Zambia and Lesotho so far. The review of actual legislative frameworks in countries shows that many principles and recommendations contained in the relevant conventions have been incorporated into national legislation. SADC members need to follow up on their commitments if they want communities to flourish. Likewise, the SADC secretariat should undertake efforts to execute its plans, such as the “Harmonisation Implementation Plan” which was adopted in 2009 within the framework “Harmonisation of Mining Policies, Standards, Legislative and Regulatory Framework in Southern Africa”.

Recommendations

(1) It is recommended that the countries which have not yet adopted ILO convention C155, as agreed upon in Article 12 of the Charter of Fundamental Rights in SADC, proceed with the adoption process and align their legislative frameworks to that Convention (Botswana, Malawi, Mozambique, Namibia, Swaziland, Tanzania, Zimbabwe).

(2) It is further recommended that SADC promotes the implementation of the SADC Declaration on Mining and particularly the “*Harmonisation of Mining Policies, Standards, Legislative and Regulatory Framework in Southern Africa*” adopted in 2006, and in the field of safety, health and environment agree on a joint approach to the elimination of silicosis and TB in the mining sector and provide common standards or codes of practice containing:

- aligned occupational hazard exposure limits for airborne pollutants;
- aligned occupational hygiene protocols for the management and control of dust in the workplace, particularly personal dust monitoring approaches and the systematic recording of lifetime exposures of mineworkers.

4.1.2. National legislative frameworks for OHS in the mining sector

The legislative review shows that all study countries have put legislation in place addressing occupational health and safety in the workplace and that would in theory protect mineworker's from dust-related occupational lung diseases. The legal frameworks clearly place the responsibility for maintaining the health and welfare of mineworkers on the mine owner.

Apart from South Africa and Mozambique, the provisions for occupational safety and health in the mining sector and particularly regulations concerning dust control in the work environment, are vague.

Occupational safety and health matters are usually addressed in both, labour and mining laws and regulations of study countries.

Only South Africa provides the mining industry with clear regulations and guidelines on how occupational hygiene systems need to be designed and controlled. It is the only country that has a documented process on achieving 'zero harm' in the mining industry and has developed and implements a 'National Programme for the Elimination of Silicosis'. Within this context and in terms of the MHS Act, mining houses are required to establish and implement a 'Mandatory code of practice (CoP) for an occupational health programme on personal exposure to airborne pollutants'⁴⁸. The South African CoP could serve as a model for the wider region, as it does not necessitate changes of or amendments to enacted legislation, but could be introduced by the competent regulator.

As stated earlier, the most comprehensive legislative framework (apart from South Africa) exists in Mozambique, however clear implementation guidelines and control systems are not in place.

All other countries refer to the importance of dust control in their legislation and provide regulations for certain aspects of dust control, such as ventilation or wetting of surfaces, personal protective equipment (PPE) etc., but do not prescribe a holistic approach. As in Mozambique, the legislation remains silent on how the regulations are to be implemented and controlled.



South Africa, Tanzania, Namibia, Mozambique and Zambia have adopted occupational exposure limits for respirable crystalline silica dust (see table 8). There are however (apart from South Africa) no guidelines or protocols on how dust monitoring and measurements should be conducted (spot sampling versus gravimetric sampling; specifications for the related equipment, etc.).

All countries, with the exception of Malawi and Lesotho, prescribe occupational health surveillance in terms of fitness to work examinations and periodic medical examinations, either in the labour laws or in the mine safety laws and regulations (or both). All countries make provisions for the reporting of occupational injuries and diseases. Occupational diseases are either defined in the labour or public health laws. Pneumoconiosis is considered a reportable and compensable occupational disease in all countries. Tuberculosis is only compensable in South Africa and Zambia.

Recommendations

(3) It is recommended that all countries (apart from South Africa) develop regulations or introduce mandatory codes of practice geared towards the elimination of exposures to hazardous air pollutants.

(4) It is recommended that Lesotho and Malawi clearly introduce OH surveillance into their legislation based on ILO Recommendation No. 171, 1985, including OH screening of ex-mineworkers.

(5) It is recommended that Swaziland, and Zimbabwe amend their legislation and cater for exit medical examinations and regular OH screening of ex-mineworkers.

⁴⁸ Guideline DME Reference Number "Department of Minerals and Energy Ref. No 16/3/2/4-A1" issued by the Chief Inspector of Mines. Effective date – 28 February 2003

4.1.3. Enforcement of legislative frameworks for OHS in the mining sector

Although there are clear gaps in the legislation or a lack of specific regulations, the legislative frameworks of all countries make provisions for the prevention of dust-related diseases in the mining sector. The frameworks clearly place the responsibility for maintaining the health and welfare of mineworkers on the mine owner. Effective enforcement of these regulations requires strong control and enforcement systems.

Country assessments show that the inspectorates of labour, mining and health are not sufficiently capacitated to play that role, with the exemption of; the South African Department of Labour and Department of Mineral Resources and partly the Zambia Ministry of Health.

The labour, health and mining inspectorates are understaffed, under resourced and do not have the necessary skills or systems to enforce the existing legislation. While extension and privatisation of the mining sectors in SADC has contributed to growth, new employment and national GDP, the control and enforcement systems have not been adapted to the new mine ownership landscape of shareholders and mine owners.

The Auditor Generals in Zambia and Tanzania have performed audits of the country's occupational health and safety systems and come to similar conclusions^{49,50}.

Interestingly the socio-economic status of a country does not predict its capacity to develop, monitor, and particularly enforce legislation, be it in the field of occupational health and safety or in the field of mine safety. It was noticed that Inspectorates with strong leadership performed better and had a clear notion of the management of hazardous dust.

Most inspectorates operate without any inspection fees within their departmental budgets, which limits institutional development and coverage. The prevention of occupational (lung) diseases in the mining sector is regulated either in the general labour laws or in specific mine health and safety laws of a country. Certain provisions are also laid down in public health laws. This makes law enforcement rather complex. Labour, health and mine safety inspectors share a joint responsibility for overseeing the occupational health and safety of the mining workforce but there is little or no coordination between Ministries. The stakeholder validation workshops performed at the end of country missions were often the first opportunity for representatives of the three ministries to share their concerns and challenges. Due to their limited capacity, most inspectorates concentrate on inspections of larger mines, where occupational hygiene standards are already high and sound occupational health and safety policies are applied as regulated.

The artisanal mining segment is not covered by inspections at all. This is related to human resources and budgetary constraints, but there is also a clear lack of concepts on how to address the manifold safety and health challenges in this segment. There are also other factors that explain the hesitance to control this sector more vigorously. Small-scale and artisanal mining generates income to communities in mineral-rich areas. Communities and the local authorities are therefore rather protective of the practice or involved in it themselves. Inspections, not to mention the closing of mines, would stir resistance and political complications.

Recommendations

(6) It is recommended that all countries (apart from South Africa) build the capacity of their labour and mine safety inspectorates (adequate human resources, equipment, skills and budgets) to effect meaningful controls and enforce set standards.

(7) It is recommended that guidelines be developed to support quality inspections of dust control systems in mines.

(8) It is recommended that where inspectorates lack the technical expertise to conduct occupational hygiene inspections, that these services be contracted out to competent service providers.

(9) It is recommended that, given the current budgetary and human resources constraints, inspectorates develop inspection plans focusing on mining operations that pose greater risk to the safety and health of workforces (medium, small and artisanal mining).

The preliminary study of the Office of the Auditor General in Zambia points out the following weaknesses:

- **Inadequate** personnel to carry out inspections
- **Inadequate** legislation.
- **Lack of** national policy
- **Inadequate** funding
- **Lack of** harmony among assorted law on OSH
- **Non-adherence** of companies to OSH requirements

Tanzania's Auditor General concludes that '... the Occupational Safety and Health Authority (OSHA) lacks specific plans for identifying unregistered workplaces and registering identified workplaces. Inspections are not efficiently planned and conducted. Similarly, there is no adequate system for ensuring that quality inspections are conducted. (...) The Ministry of Labour and Employment had not performed the monitoring and evaluation function (...).'

Fig 3: Citation of conclusions in the Auditor General reports on occupational safety and health systems in Zambia and Tanzania

⁴⁹ United Republic of Tanzania National Audit Office (2013): A performance report on the management of occupational health and safety in Tanzania.

⁵⁰ Office of the Auditor General Zambia (2015): Report of the Auditor General on the management of occupational safety and health.

4.1.4. Application of OSH legislation in the mining sector

Although there are clearly shortcomings in the definition of occupational hygiene standards in the legislation (apart from South Africa), the larger multinational mining houses work towards internally set and internationally aligned occupational hygiene standards, including clear occupational exposure limits (OELs) for harmful dusts. The large-scale mining industry is also moving from human resource intensive mining to more automated processes, which facilitates the protection of workforces from occupational hazards such as dust, noise and heat. The most sophisticated occupational health and hygiene systems within the industry are found in South Africa and Namibia, with their long tradition in mining and Chambers of Mines taking charge of setting standards and disseminating good practice within the industry.

There is great variation on how OSH legislation is applied in medium-scale mines which is dependent on the ownership and the profitability of the mining operation. Substandard mining operation remain non-compliant due to the weak inspection systems in place and a lack of authority of inspector's. The most problematic areas are small-scale and artisanal small-scale mines. Although the owners of these enterprises hold a valid mining license, they tend not to apply the existing mine health and safety regulations and standards issued by mining, health or labour authorities.

There are deficiencies in risk assessments, limited access to technical expertise and equipment used to conduct hazard monitoring and deficient management systems leading to the inability to comply with current health and safety standards⁵¹.

Apart from South Africa, the Unions have not sufficiently picked up on health and safety matters of their members and are more concerned with wages and the practice of contracting out mine work to sub-contractors (thus retrenching many mineworkers from regular employment) and undermining collective bargaining agreements. Even the mineworkers themselves appear to be less concerned about their health than about their income, being mostly young and healthy when signing up with the industry.

Recommendations

(10) It is recommended that the Chambers of Mines and other Mining Associations adopt an active role in guiding and supervising their member's compliance with the current legislation in their respective countries.

(11) It is recommended that the Mineworker Unions place greater importance on safety and health of their members and participate actively in tripartite bodies promoting state-of-the-art occupational safety and health standards for application within the mining industry.

4.2. Integrated, patient-centred care and prevention



4.2.1. Occupational health service coverage for mine workers

Zambia and Tanzania are the only countries where occupational health screening is performed by the public sector. In Zambia, the Occupational Health Institute in Kitwe performs all medical screening examination on mine workers. In Tanzania, the Occupational Safety and Health Authority performs occupational health screening either with its own staff or through contracted medical practitioners. In all other countries, occupational health screening is performed in medical facilities on mining sites or contracted out to occupational health service providers by the mining houses.

Mineworkers employed in large and medium-scale mining operations are relatively well protected in terms of occupational health and safety. Particularly, large-scale mining houses provide excellent, mostly above country-standard PHC, emergency and occupational health surveillance services combined with health promotion, prevention and well-being programmes (BOHS III/IV). The actions of international mining corporations are globally observed and pursuing certifications such as ISO 14000 (environmental certification), SA 8000 (working conditions certification), OHSAS 18000/1, and AA 1000 (accountability certification), influence the way health, safety and environment systems are designed and managed.

More challenges are found in medium-scale mining, depending on the size of the operation and the operator. Service provision reaches from BOHS stages I/II to mines without any adequate health and safety system in place. Clearly, the limited implementation of regular health and safety inspections and the enforcement of existing laws and regulations contribute to the non-compliance of many workplaces in this mining segment.

⁵¹ Marriott, A (2008): Extending health and safety protection to informal workers: an analysis of small-scale mining in KwaZulu-Natal. Research Report No. 76



The most underserved mineworkers are those of small-scale or artisanal mines. Although the owners of these enterprises mostly hold a valid mining license, they tend not to apply the OHS regulations and standards issued by mining, health or labour authorities.

In none of the visited countries had the mineworkers of small-scale and artisanal mines visited undergone any pre-employment health check, let alone periodic examinations as stipulated by law. In all visited mines, the mine managers were former mineworkers of larger mining operation in the country or abroad and had participated themselves in occupational health surveillance programmes offered, either by the government or the mines.

When asked why their labour force was not undergoing these examinations they answered it was for financial or contractual reasons. Small-scale mines have usually a small permanent workforce and contractors are doing the bulk of the work. Contractors are mostly paid on a commission basis. Until production, the mineworker only receives food and shelter at the mine in return for his or her labour.

The limited availability of occupational health services near small-scale and artisanal mining areas, financial access barriers and the low degree of risk awareness contribute to low uptake of services by this mining population. While in the middle-income study countries the availability and accessibility of public health services is much better than in the lower income countries, there is at least certain coverage with general health services. The capacity of these decentralized public services to diagnose occupational diseases is however very limited or non-existent.

Recommendations

(12) All countries, including South Africa, need to provide for a system of decentralized occupational health service provision (BOHS II/III) either through public or private providers that allows for OH screening for underserved mineworker populations, including ex-mineworkers. The OH Service Centres approach, implemented within the context of the overall TIMS project in eight of the study countries, provides a good model to be scaled up to underserved mining areas. Ideally the model should be paired with outreach interventions, covering remote rural areas where artisanal small-scale mining takes place and ex-mineworkers are retiring to.

4.2.2. Social protection of diseased mineworkers

Compensation for employment-related injuries and diseases is the oldest and most widespread form of social protection⁵². All study countries have established compensation systems, which are either based on employer liability or are integrated into social protection schemes.

Occupational lung diseases, and particularly the various forms of pneumoconiosis, are compensable in all study countries. Tuberculosis is compensable in South Africa and Zambia. In other countries, it is compensable in connection with a diagnosed pneumoconiosis or more specifically, silicosis. However, research strongly suggests that exposure to significant levels of silica dust in high HIV prevalence settings substantially increases the risk of developing active pulmonary tuberculosis⁵³. This supports the suggestion to integrate tuberculosis as a compensable disease when significant exposure is confirmed.

The compensation systems cater theoretically for current and ex-mineworkers, as well as for their dependents. However, in each of the countries, the systems face specific constraints in implementing a proper compensation process. While the compensation of claims from work-related injuries is a relatively straightforward process, the compensation of occupational diseases evolving over time and mostly long after formal employment, poses a great challenge. All countries face challenges in the compensation of ex-mineworkers. Apart from Zambia and South Africa, there are no systems in place to conduct regular medical benefit examinations for ex-mineworkers. But even in the two countries, many mineworkers having retired back to their rural homes are lost to follow up. There are no systems in place to systematically track and trace ex-mineworkers and encourage their participation in medical screening. South Africa (even though the country has the most fragmented worker compensation system, where a separate Act (ODMWA) regulates the compensation of occupational lung diseases in mineworkers), is currently developing an integrated database containing current and ex-mineworker information. It is expected that this database will allow for the physical tracing of ex-

mineworkers and the upload of medical information obtained during mine work, which will facilitate compensation.

Mineworkers in small-scale or artisanal mining are not registered and do not contribute to compensation funds and are thus not eligible for compensation of work-related injuries or diseases. Particularly in countries like Tanzania, Mozambique and Zimbabwe, with huge artisanal mineworker populations, this will pose a burden on the public health and social security systems, when mineworkers fall sick and are left without social protection of any kind.

Recommendations

(13) Tuberculosis should be recognised as a compensable disease in countries where this is not yet the case. However, compensation should only be provided for when a mineworker has been exposed to significant levels of respirable crystalline silica dust during work life. Respective definitions must be elaborated (South Africa minimum of 200 shift).

(14) It is recommended that countries develop policies and approaches to track and trace ex-mineworkers and offer medical benefit examinations.

(15) Ideally medical benefit examinations should be included into decentralised occupational health services, which would facilitate the access of ex-mineworkers and mineworkers in small-scale or artisanal mines.

(16) To integrate artisanal mine work into social security systems, mutual health insurance approaches should be considered in order to support mineworkers and families after loss of income resultant upon work-related injury or illness.

4.3. Intensified research and innovation

4.3.1. Research

Occupational health surveillance and studies

Reporting of occupational injuries and diseases is prescribed in the legislation of all countries.

In South Africa and Zambia, occupational surveillance systems in the mining sectors provide the most reliable data on occupational diseases and conditions, and statistics provide sufficient information to guide policy and strategy development. In all other countries, statistics cannot be relied upon because reporting mechanisms are unclear, there is confusion about how and to whom to report to, or reporting requirements are not adhered to. The competent authorities do not enforce reporting. Databases at inspectorates are often paper based, contain incomplete information and are not analysed or processed into meaningful statistics and annual reports. Respectively, baseline information on the burden of occupational (lung) diseases in the mining sectors is not readily available.

⁵² Fultz, E.; Pieris, B.: Employment injury schemes in Southern Africa. An overview and proposals for future directions. ILO/SAMAT Policy Paper No. 7. ILO, Harare, Zimbabwe

⁵³ Corbett et al. (1999): Incidence of tuberculosis and HIV and progression of silicosis and lung function impairment among former basotho gold miners. Online: http://www.academia.edu/18463448/Incidence_of_tuberculosis_and_HIV_and_progression_of_silicosis_and_lung_function_impairment_among_former_basotho_gold_miners. Accessed 06.03.2017

Since the pneumoconiosis has long latencies and the ex-mineworker community is not screened systematically, there are further information gaps. Medical practitioners and service providers are unfamiliar with occupational diseases and with reporting requirements. There are important knowledge gaps where the health of the ex-mineworker communities is concerned. Even worse applies to artisanal small-scale workforces who have at best, only access to the public health systems.

Research is done sporadically, often in the context of University programs or development projects. However, research findings are not usually processed further, to inform policy development. The relevant authorities are rarely aware of these studies.

A systematic approach to research is found in South Africa, where the National Institute of Occupational Health plays a key role in looking into occupational health concerns across the country and sectors. The Occupational Health and Safety Institute in Kitwe also produces and publishes research reports, but does not follow a laid-out research agenda.

Dust emissions and country risk profiles

While in South Africa the mining industry must report on hazardous dust types and emissions to the Department of Mineral Resources, baseline data on types of dust and dust emissions are not available from the Ministries of Mines in all other study countries. The mining industry (particularly large mines) however does keep such data but does not commonly share this with the authorities or within the industry.

The collection of baseline data and the subsequent development of risk profiles could help focus inspection plans on high risk areas.

4.3.2. Innovative approaches

During country visits several innovative approaches for occupational hygiene knowledge management and dissemination within the mining industry have been observed.

Namibia has established a quarterly peer review mechanism where the Chamber of Mines Safety Committee, the Unions, the Chief Inspector of Mines and mining industry technicians jointly inspect and discuss mine safety systems in a particular mine.

The South African Chamber of Mines has established the Mine Occupational Safety and Health Learning Hub (MOSH) sharing and adopting leading practice in the mining industry.

These models can be shared as good practice and implemented elsewhere in study countries.

The Zambia Chamber of Mines has established a Mining Sector Education Trust (ZAMSET), which supports skills development in mining industry. It provides an opportunity for integration of occupational hygiene matters in their curricula and courses.

Recommendations

(17) Research on true burden of pneumoconiosis and TB in study countries.

(18) Accountable Ministries must develop robust occupational health surveillance systems with integrated electronic databases.

(19) Conduct baseline studies on types of dusts and dust emissions in the mining sectors.

(20) Adoption of models for industry-wide learning mechanisms as implemented in SA, Namibia and Zambia.



4.4. Key intervention recommendations

Based on the findings from this legislative review, the following key conclusions and recommendations are proposed:

Conclusion I:

The laws, regulations and implementation guidelines in study countries (except South Africa) targeting dust control and prevention of occupational lung diseases in the mining sector are imprecise, fragmented, out-dated and do not provide for a hierarchy of controls to be established in mining operations. Baseline knowledge about silica dust emissions and subsequently, high and low-risk areas for occupational lung diseases, are not available and cannot guide the development of risk profiles and respective risk reduction programs.

Intervention recommendation I:

Provide technical assistance to Ministries of Mines/Mineral Resources for the development of national dust control programs as follows:

- Technical support to conduct baseline research on silica dust emissions and risk profiling in mining- intensive countries (Tanzania, Mozambique, Zimbabwe, Namibia and Botswana) where reliable statistics are not available.
- Research on the true burden of pneumoconiosis among current and particularly exmineworkers in mining- intensive countries (Tanzania, Mozambique, Zimbabwe, Namibia and Botswana) where reliable statistics are not available.
- Technical support for the development and implementation of a mandatory code of practice on personal exposure to airborne pollutants to be applied by the mining industries.
- Capacity development (knowledge, skills and equipment) of the relevant inspectorates in order that they may supervise and inspect the implementation of the CoP in the mining industry.
- Technical support and facilitation of a roll-out campaign for the introduction of the CoP in collaboration with the Chambers of Mines, other mining associations and the relevant Unions.

Conclusion II:

Artisanal small-scale mining provides employment and income to several hundred thousand mineworkers in the sector, but there is no awareness about the most basic safety and health matters to be considered to provide minimum protection to employees/day labourers. The relevant Ministries lack appropriate strategies to address safety and health concerns within this mining segment and the attainment of better protection of the workforce.

Intervention recommendation II:

- Provide technical assistance to Ministries of Mines/Mineral resources and/or Labour to develop and apply occupational safety and health concepts for artisanal small-scale mining operations, particularly in Tanzania, Mozambique and Zimbabwe.
- Provide technical support to the relevant Ministries in developing risk awareness and risk protection concepts for artisanal small-scale miners.
- Support capacity building of inspectorates and small-scale mining associations in order that they may conduct risk awareness and risk protection training with artisanal small-scale miners and peri-mining communities.
- Roll-out of respective training in selected high-risk areas.



5. ANNEXES

Annex 1: Country visit dates and team structure

| Country | Mission dates | Experts | National Coordinator |
|--------------|---------------------|------------------------------------|----------------------|
| Lesotho | 21.09. – 27.09.2016 | A. Kamadu, V. Govender, A. van Zyl | Isaacs Shafiq |
| Swaziland | 03.10. – 08.10.2016 | A. van Zyl, A. Kamadu | No coordinator |
| Mozambique | 14.12. – 19.12.2016 | A. van Zyl, L. Daemmer | Francisco de Assis |
| Botswana | 11.10. – 22.10.2016 | V. Govender, A. van Zyl | Kitso Phiri |
| Malawi | 13.02. – 20.02.2017 | L. Askham, A. van Zyl | No coordinator |
| Zimbabwe | 30.01. – 03.02.2017 | L. Askham, A. van Zyl | Dingani Moyo |
| Tanzania | 28.11. – 03.12.2016 | A. van Zyl, G. Reiprich | Fidelis Owenja |
| Namibia | 16.01. – 23.01.2017 | A. Kamadu, A. van Zyl, G. Reiprich | Zandile Erkana |
| Zambia | 31.10. – 04.11.2016 | A. van Zyl, G. Reiprich | Patrick Hayumbu |
| South Africa | First Quarter 2017 | A. van Zyl, A. Kamadu, G. Reiprich | Health Focus Team |

Annex 2: Overview on most relevant ILO conventions and recommendations

In 1950, the International *Labour Organisation* (ILO) and the *World Health Organization* (WHO) defined occupational health as “the promotion and maintenance of the highest degree of physical, mental and social wellbeing of workers in all occupations by preventing departures from health, controlling risks and the adaptation of work to people, and people to their jobs.” Occupational health, as it is practised in the mining industry considers the impact of workplace exposures on workers’ health, working closely with the occupational hygiene discipline within a risk management framework. Together with occupational medicine occupational health provides risk based medical surveillance programmes directed to individual workers.

Four ILO conventions define the fundamental principles of occupational health and safety for the mining sector: Convention No. 155, Convention No. 161, Convention No. 176 and Convention No. 187. ILO Convention No. 155, (1981) on *Occupational Safety and Health* (OSH) provides for the adoption of a coherent national occupational safety and health policy, as well as action to be taken by governments and within enterprises to promote occupational safety and health to improve working conditions. One of the key features of this regulatory framework is the introduction of a single overarching OSH law, replacing earlier laws, to cover all workers and all hazards at work. This is fundamental to the development of national OHS services and ties in closely with conventions 161 and 171.

ILO Convention No. 161 (1983) on *Occupational Health Services* (OHS) and its accompanying recommendation No. 171 (1985) serve as models for establishing requirements for the organization and functioning of occupational health services. According to the convention the term “occupational health services” means services entrusted with essentially preventive functions, responsible for advising the employer, the workers and their representatives in the workplace on: the requirements for establishing and maintaining a safe and healthy working environment which will facilitate optimal physical and mental health in relation to work; the adaptation of work to the capabilities of workers in the light of their state of physical and mental health. (Article 1(a)) Good occupational health practice, according to Article 1(a) of this convention, involves health promotion and protection activities of workers’ health. This means that the improvement of working conditions and environment carried out by occupational safety and health professionals as well as other specialists, such as occupational hygienists, is vital.

The Occupational Health Services Recommendation No. 171 stipulates that the functions of OHS should comprise monitoring of workers’ exposure to health hazards, provide personal protective equipment for workers and to collaborate on job placement and better adaptation of work to the workers. OHS should also participate in the analysis of occupational accidents and occupational diseases and in accident prevention programmes. The surveillance of the working environment should include the identification and evaluation of the environmental factors, which may affect the workers’ health.

Occupational hygiene assessments and organizational and environmental risk factors should be documented and mitigated.

The most recent ILO Convention No. 187 Promotional Framework for Occupational Safety and Health (2006) aims to promote a preventative safety and health culture and progressively achieving a safe and healthy working environment. It requires States that ratified the conventions to develop, in consultation with the most representative organizations of employers and workers, a national policy, a national system, and a national programme on occupational safety and health.

Under the ILO Convention No. 176 on Safety and Health in Mines the employer is mandated to assess and eliminate all risks, control the risk at source and minimize the risk by means that include the design of safe work systems. If the risk were to remain, the employer is to provide personal protective equipment, that is reasonable, practicable and feasible, and conforms to good practice and the exercise of due diligence.

The ILO Conventions C017 and C018 as well as C018’s revised version C042 are concerned with the Compensation of Occupational Injuries (C017) and Diseases (C018/042). Convention C042 covers, among others, the compensation of silicosis, silico-tuberculosis and workplace related intoxications (e.g. mercury intoxications).

Beside the above conventions, the ILO has adopted more than 40 standards specifically dealing with occupational safety and health, as well as over 40 Codes of Practice⁵⁴.

⁵⁴ ILO (1981): C155 – Occupational Safety and Health Convention, 1981 (No. 155). Online 08.12.2015: http://www.ilo.org/century/history/iloandyou/WCMS_211520/lang--en/index.htm



Annex 3: Interview guide for semi-structured key informant interviews

In-depth interviews (IDIs) with respondents in each country who are directly or indirectly involved in matters of occupational health and safety in the mining sector. Interviewees selected on a purposive sampling basis from the following groups:

- a) Cadres of Ministries/Departments responsible for labour, social security and occupational health and safety.
- b) Occupational health and mine health and safety inspectorates.
- c) Representatives of relevant employers (in the mining sector, e.g. Mining Houses, Chamber of Mines, Mining associations, etc.)
- d) Representatives of relevant employee/worker's organizations, guilds and/or trade unions.
- e) Occupational health delivery personnel.
- f) Representatives of occupational health, accident and life insurers/compensation funds.
- g) Mine owners, mine managers, health and safety officers.
- h) Representatives of small scale and artisanal mining associations.
- i) Artisanal small-scale mine owners, mine managers, safety officers.

Guide and key themes/questions for semi-structured interviews

Before each interview the relevant questions will be selected from the key questions below. The selection will depend on the professional background and the function/position of the interviewee in his/her organisation.

The interview will start with a short presentation of the team or interviewer and a quick presentation of the cause for the interview – overall study subject and questions. Following this introduction, the interviewee(s) is/are given space to present him/her/themselves, the organisation and their general relation to the study subject.

From this starting point, the set of preselected questions will be covered, leaving enough room for the discovery of new and unexpected topics and aspects brought up by the interviewee(s).

a. Policy level questions (groups a, b, c, d, f):

- What are the relevant laws and regulations governing occupational health and mine safety in the country?
- Are there particular occupational health regulations for the mining sector?
- Are there particular regulations setting silica dust exposure limits?
- Is there a policy framework for reducing exposure to dust?
- Is there an occupational health policy?
- What are the relevant institutions/organisations involved in the administration of laws and regulations?
- Is there any kind of tri-partite body concerned with occupational health and safety in general and/or the mining sector?
- How is occupational health embedded in the overall health system?
- Are there any documents or guidelines linking occupational health and TB/HIV/AIDS service provision?
- Are there any policy documents or guidelines linking occupational diseases/injuries with rehabilitation systems?
- How is occupational health and safety including compensation financed?
- Are there any challenges that the country is facing with regards to OHS services delivered to the mining industry?

b. System level questions (groups a, b, c, d, f):

- Where is mining practised, which commodities, by who and what is the size of operations? (rough mapping).
- What kind of mining licenses are issued, how is artisanal small-scale mining (ASSM) regulated?
- Which are the competent and regulatory authorities for occupational health and safety including tuberculosis in the mining sector?
- How is inspection organised and carried out (occupational health/mine safety – capacity of inspectorates)?
- How is occupational health & safety human capacity build - physicians, nurses, and safety technicians?

⁵⁴ ILO (1981): C155 – Occupational Safety and Health Convention, 1981 (No. 155). Online 08.12.2015: http://www.ilo.org/century/history/iloandyou/WCMS_211520/lang--en/index.htm

- How is occupational health implemented by the mining industry? (models (of good practice) in sector - multinationals vs middle sized national vs small scale and artisanal).
- What kind of public occupational health services exist, if any, and what is the capacity/coverage?
- How is the compensation system designed and set up?
- How does the compensation systems work?
- How are ex-mineworkers reached and covered?
- How are artisanal small-scale mineworkers reached and covered?
- What kind of rehabilitation system exists in the country?
- What are the main challenges the system(s) is/are facing?

c. OH Service level questions (groups b, e)

- What occupational health service packages are offered?
- Is use made of specific (in-service, national, international) guidelines?
- Are there particular quality management systems in place (e.g. service standards (SOPs)?
- How many workers are catered for?
- What are the current staffing levels and qualifications?
- What is the organisational set up (patient flow)?
- What is the current referral practice (chronic disease management, particularly for TB and AIDS treatment, compensation services, social services, rehabilitation)?
- What kind of data management and record keeping systems are used?
- Any statistics on tuberculosis cases and silicosis cases?
- Are there competent staffs to diagnose a silicosis (WHO trained)?
- How are artisanal small-scale mineworkers reached and covered?
- How are ex-mineworkers reached and covered?
- How do inspections take place?
- What are the main challenges for occupational health service access of and service delivery to mineworkers?

d. Large and medium size mining operation questions (groups c, d, g)

- Has the mine obtained any international certification such as ISO 14 000?
- Is the mine carrying our regular risk assessments and develop risk mitigation plans? (Hazard identification analyses and records, risk assessment documents, including any baseline analyses, company health and safety policies and procedures)?
- How is occupational health and safety organised at the mine, e.g. what kind of occupational health services are offered, what kind of primary health care, how accidents and injuries are taken care of, if rehabilitation services exist?
- How many employees are covered by health schemes?
- Is there a difference in terms of coverage for contracted mineworkers?
- What are the main hazards at the mine?
- How many persons are employed to secure health and safety with what type of prof. profiles/qualifications.
- What is done to mitigate the existing hazards?
- How is dust control managed at the mine?
- What kind of PPEs are provided by the mine to protect mineworkers?
- How does the mine work with the public system – for HIV and AIDS treatment and care, for TB treatment and care, etc.
- Who oversees occupational health services and who provides them to the mine?
- Who oversees mine safety?
- What does a typical mining health centre/point look like?
- Does any reporting take place of occupational injuries or diseases?
- Is the mine paying into a compensation system for occupational injuries, diseases, e.g. silicosis or other chronic conditions? Who is covered – employees – contractors?
- Any other interesting project/intervention in the field of mine health and safety.

e. (Artisanal) Small-scale mining operation questions (groups g, h, i)

General information about the operation and mine health and safety

- What commodity are you mining? Surface or underground mining practice?
- What kind of mining license do you hold?
- How many mineworkers are working on the mine?
- How is the payment system for mineworkers (employed, commission base)?
- What are your main challenges regarding the health and safety of your workers?
- Have you ever carried out a health risk assessment at the mine?
- Do you have a health and safety officer? What is his qualification?
- Do you have a health and safety plan?
- Do you train your workforce on health and safety topics (if yes, how often, which topics)?
- Do you provide PPEs to your workers? What kind of PPEs? How often are they replaced?
- Do you insist on wearing PPEs?
- How often are you inspected? What kinds of inspections take place?
- Are your workers participating in any occupational health-screening program? If yes, by who and how often?
- Have you heard about a miner's disease called silicosis (black lung, miner's phthisis) or about any other lung disease to be contracted in the context of mine work?
- What would you say are the causes of silicosis?
- If a worker is injured or sick – what do you do?
- Has any of your workers in the past six months called in sick with tuberculosis? If yes, where does he get treatment from?

Leading Practice

- If you wanted to apply basic health and safety rules protecting your workforce from any kind of hazards, what are the most important issues you wanted to address?
- If you want to apply a basic dust control system in your mine, what do you think would be the greatest benefits of accepting (or making this practice your own) this at your mine?
- Would there be any downsides of accepting and applying this at your workplace?
- What do you think it would take for the acceptance and application of this programme to be considered a top priority in your workplace? Please explain your answer.
- What about this programme do you think might be a problem at your or other mines? Why?
- What would you need to get full buy-in from your Leadership / subordinates / co-workers?
- What information and data would you need?
- How would you prefer to get such information and from what source?
- Who else would you need to convince?
- What do you think are the most important things to do to achieve success?
 - a. Training –special training – awareness and educational programmes?
 - b. Access to resources – availability money for equipment and people?
 - c. Motivation - Special incentives?
 - d. Leadership – any special qualities / or behaviours considered necessary?

Leadership

- Who at your workplace, (worker / supervisor / leader), would have the greatest influence on the acceptance and successful application of better dust control? Why?
- What would be the most important thing that a leader should do to support employees / team members / co-workers in accepting and applying the rules for better dust control? Why would this be important?
- Communication – what would be important to communicate? By whom? What kind of material would support you in the mining site (brochures, posters, others)
- Are there things that could prevent successful acceptance and application of this programme at your working place? Why?



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