Principles and practice of occupational hygiene in South Africa

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Primary aim

- Prevent harm to employees
- Prevent regulatory action against the Company
- Minimise the risk of legal claims against the company for occupational diseases, injuries and deaths
- Minimise reputational risk
- Disaster prevention
**Principles**

**Anticipation & Identification**
- What is there that could harm the health of employees and what are the sources?
- Information/data (sources, exposure, workplace levels, controls, etc.)
- Who could be exposed? How? Similar exposure groups (SEGs)
- What are the current control?
- Health risk & control registers

**Evaluation**
- How much?
  - Exposure and workplace data and exposure trend analysis
  - Quantitative, semi-qualitative or qualitative
  - Degree of exposure, frequency of exposure and exposure patterns
  - Personal exposure measurements & workplace measurements

**Control**
- What is done and can we do more?
  - Control at source principle
  - Identify & quantify current controls (original design and performance parameters, current performance, availability, efficiency, maintenance schedule)
  - Control improvements &/or additional controls
  - Workplace environment incidents
  - Reporting and communication
Occupational hygiene in South Africa

Mines & works

• 1910
• Mines & Works Act, 1911
• Minerals Act, 1991
• Mine Health & Safety Act, 1996
• DMR
• Ventilation Engineers
• Mine Ventilation Society of SA
• Main focus on dust & noise
• ODMWA

Industry

• Occupational Health & Safety Act, 1993
• DoL
• Occupational Hygienists
• Southern African Institute of Occupational Hygiene (SAIOH)
• Lead, asbestos, HCS, Mercury, noise, etc.
• COIDA
Occ Hygiene profession in South Africa

- Mines & Works (MHSA)
  - Section 12 appointment
  - CoM Certificate in Mine Environmental Control
  - Professional registration not formalized

- Industry (OHSA)
  - Approved Inspection Authorities (AIAs)
  - Occupational Hygienist / Technologist / Assistant
  - SAIOH is a SAQA recognized professional body
  - SAIOH independent PCB
Appointed Occupational Hygienists

Legal responsibilities in terms of section 12.1 of the MHSA

1. System of Occupational Hygiene Measurements
Section 12.1 of the MHSA
System of Occupational Hygiene measurements to be implemented.

Section 12.3 of the MHSA
Record of all occupational hygiene measurements to be kept in a manner that can be linked as far as practicable to each employee’s record of medical surveillance.

2. Reporting of Results
Regulation 9.2(7) of the MHSA
Requires that the results of the system of Occupational Hygiene measurements to be submitted quarterly to the DMR on statutory forms.

3. Risk Assessment
Regulation 9.2(2) – Identification of significant stressors
Airborne Pollutants:
Particulates $>\frac{1}{10}$ of the occupational exposure limit

Gases and vapours $>\frac{1}{2}$ of the occupational exposure limit

Thermal Stress:
Heat $>25.0^\circ C$ wet bulb and/or $>32.0^\circ C$ dry bulb and/or $>32.0^\circ C$ mean radiant temperature

Cold $<10^\circ C$ equivalent chill temperature:
Noise $>82dBL_{Aeq,8h}$

4. System of Occupational Hygiene Measurements
Section 9.2 of the MHSA
COPs must be developed where guidelines for a COP have been issued by the Chief Inspector of Mines. The following COPs generally incorporate the system of Occupational Hygiene measurements:
- Airborne Pollutants
- Noise
- Thermal Stress
COPs are to be revised periodically or following an incident etc.

5. Fires and Explosions
Regulation 5.1(1) of the MHSA
Hygienist to report to the employer on:
Effectiveness of the precautionary measures taken to prevent or suppress explosions of coal dust or flammable gas, and on the adequacy of measures in place to prevent, detect and combat the start and spread of mine fires.

6. COP Flammable Gas Explosion
Where the risk determines the need a COP is required in accordance with the guidelines issued, in terms of section 9.2 of the MHSA, for “the prevention of flammable gas explosions in mines other than coal mines”.

7. Early Warning Systems
Regulation 9.1(2) of the MHSA
Requires that where the risk assessment at the mine indicates a significant risk of a fire and/or explosion and/or toxic release, that could lead to an irrespirable atmosphere or an atmosphere immediately dangerous to life or health, the employer must provide an early warning system or systems at all working places.

8. Working Places where work has ceased
Regulation 9.1(4) of the MHSA
Reasonable practicable measures to be taken to ensure that no employee is exposed to any health hazard at, or emanating from, any working place where work has ceased, either temporarily or permanently.

9. Report to Employer
Regulation 9.2(3)(b) of the MHSA
The 12.1 appointee must report to the employer on occupational hygiene hazards that may cause illness or adverse health effects to persons, assess the results in terms of the implementation of control systems and the management thereof, and recommend remedial actions to the employer.
10. **Provision of Potable and Palatable Water**
Schedule 22.9(2)(c) of the MHSA
Potable water quality to be compliant with the legislated limits.

11. **Respiratory Protective Equipment**
Regulation 9.2(8) of the MHSA
The employer must ensure that all respiratory protective equipment used at a mine, other than body-worn self-contained self-rescuers, comply with the South African Bureau of Standards Code of Practice, Homologation of respiratory equipment SABS 0338.

12. **Working clothes**
Regulation 9.2(6) of the MHSA
Employees, who perform work involving hazardous substances, must not remove their working clothes from the mine unless such clothes have been decontaminated.

13. **Rescue, first aid and emergency preparedness and response**
Regulation 16.1(1) of the MHSA
The appointed 12.1 person must report to the employer on the adequacy of escape and rescue procedures at the mine relating to explosions, fires and flooding.

14. **Occupational exposure to health hazards**
Regulation 9.2(1) of the MHSA
The employer must ensure that the occupational exposure to health hazards of employees is maintained below the limits set out in Schedule 22.9(2)(a) and (b).

15. **Illumination**
Regulation 9.2(9) of the MHSA
Illumination at all working places must be sufficient to enable employees to perform their work safely.

16. **Investigations**
Section 11.5 of the MHSA
Investigations to be conducted into all serious illness cases and health threatening occurrences. These investigations are to commence within 10 days from the date of such diagnosis and or incident and the completed investigation report to be submitted to the Principal Inspector of Mines within 30 days.

17. **Record of Hazardous Work**
Section 14 of the MHSA
The manager at every mine must keep a service record, in the prescribed form, of employees at the mine who perform work in respect of which medical surveillance is conducted in terms of section 13.
Occupational hygiene qualification routes

(example from Anglo American Operations (Pty) Limited)

**Academic study**
- Professional registration as an Occupational Hygienist

**Advanced qualification**
- Professional registration as an Occupational Hygiene Technologist

**Intermediate qualification**
- Professional registration as an Occupational Hygiene Assistant

**Fundamental qualification**
- Gr12 (with Maths & Science)
- College diploma

**Entry level qualification**
- CoM CMEC Intermediate
- CoM CMEC Advance
- CoM CMEC Practical

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**Senior Occupational Hygienist / Occupational Hygiene Manager**
- Post graduate qualification in Occ Hygiene (Masters, PhD, etc), or MPH, or similar & 24 months practical experience

**Occupational Hygienist**
- Degree or diploma from accredited college or university occ hygiene or related science and 36 months practical experience

**Occupational Hygiene Technologist**
- Occupational Hygiene Assistant
- Occupational Hygiene Trainee

**OHTA Intermediate** W501 – W507 & 12 months practical experience
- Occupational Hygiene Assistant
- Occupational Hygiene Trainee

**OHTA Foundation** W201 – Basic Principles
- Gr12 (with Maths & Science)

**Other related disciplines** (safety, environment, chemistry, etc)
- Graduate (BTech, NDP, MPH, BSc, BSc Hons, MSc)

Anglo America Occupational Hygiene PIT programme (24-36 months)
### Professional registration

#### South Africa

**Southern African Institute of Occupational Hygiene (SAIOH) (recognised by IOHA)**

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<th>Level</th>
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| **Registered Occupational Hygiene Assistant (ROHA)** | **Education**: Grade 12 school certificate or a 120 NQF Credits (i.e. 1 year tertiary study qualification with a technical/scientific academic background **OR** a student in his/her third year studying a Diploma in Environmental Health or a National Diploma or Degree in a technical or scientific discipline.)  
**Experience**: No experience necessary. |
| **Registered Occupational Hygiene Technologist (ROHT)** | **Education**: 360 NQF credits i.e. 3 years tertiary study  
**Experience**: At least 2 years of relevant occupational hygiene experience. |
| **Registered Occupational Hygienist (ROH)** | **Education**: 480 NQF credits i.e. four years tertiary study  
**Experience**: At least 5 years relevant occupational hygiene experience. |
SAIOH history

- Pre-1976: Few company led initiatives
- 1976: Erasmus report
- 1983: Occupational Hygiene Association of South Africa – OHASA
- 1993: Institute of Occupational Hygienists of South Africa – IOHSA
- 1996: IOHA membership for IOHSA
- 2000: OHASA & IOHSA merge
- 2000: Southern Africa Institute of Occupational Hygiene - SAIOH
- 2012: SAQA registration as professional body
- 2014: SAIOH offices in Midrand & appointment of full-time CAO
- 2015: 5 year strategic plan launched
Changing SA scenery

- Mine Health & Safety Bill
- Occupational Health & Safety Bill

- OHSA Hazardous Chemicals Substances Regulations review
- OHSA Lead Regulations review
- OHSA Asbestos Regulations review

- SANAS 17020 – OHSA DoL AIAs

- Mines Risk Committee

- Compensation system review

- Ongoing and new litigation

- Section 54’s and stoppages
Towards the future

- 4y full time BSc degree in occupational hygiene degree from the North West University
- Occupational hygiene Niche Area at the North West University
- Anglo American Wits Chair in Occupational Hygiene
- OHTA part-time occupational hygiene qualification route
- SAQA Occupational Hygiene recognition
- Southern Hemisphere occupational health and hygiene research alliance
Current challenges

- Skill scarcity
- Pockets of excellence vs. bad practices
- DMR and DoL “misalignment”
- Legal framework focused on exposure measurement
- Occupational exposure data and/or the quality of available data remains an area for future improvement.
- Move from “general” & dated data to specific & real-time data
- Potential contribution of external / “off the job” / recreational exposures
- Importance of occupational hygiene measurements (source, controls, workplace environment and personal exposure) to quantify risk and impact
- Importance of medical surveillance (initial, periodic and exit) and the linkage with occupational hygiene measurements
- Need an improved understanding of the sources and controls
Future influences

- Drifting OEL’s
- New knowledge
- Aging workforce
- New technologies
- Strengthened compliance
Occupational hygiene programme

- $$$
- People
- Infrastructure
- Equipment
- Materials

- People
- Infrastructure
- Equipment
- Materials

- HIRA
- Exposure assessment
- Education & training
- Control management
- Monitor & review
- Quality assurance
- Record keeping

- Change management
- Communication
- Time frame

- Other disciplines
- Authorities
- Employees
- OEMs
- Experts

Programme elements

Implementation plan

Stakeholders

Resources
Thank you