

The evolution of occupational hygiene in the SA Mining Industry



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1.0

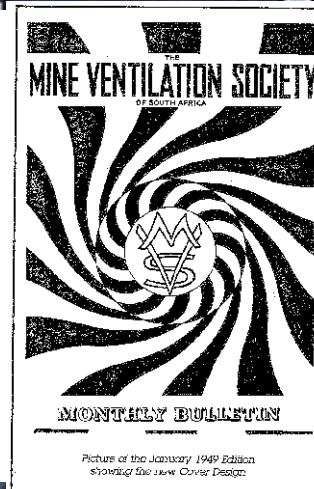
History

- 1886 – mining started on the Witwatersrand with a few small diggings
- 1898 – first deep level shaft (3000ft)
- 1900 – drilling machines powered by compressed air
- 1902 – first report on dust by the Government Mining Engineer
- 1903 – Miner Commission Report included a reference to the dangers of “the inhalation of small Silica particulates”
- 1904 – Chamber of Mines “Anti-Dust Device” competition
- 1905 – First dust preventative regulations published (and withdrawn in 1906 because the workforce objected to them)
- 1908 – New Regulations on the prevention of dust promulgated
- 1910 – Provision for hospital care & treatment of miners with Phthisis

- **1910 – Krause Commission**
 - Mine Manager responsible to provide water to reduce dust
- **1911 – Mines Phthisis Commission introduced compensation for miners with Phthisis**
- **1912-1919 – Mines Phthisis Commission undertake extensive investigations into improving methods of dust measurement and dust control**
 - Appointment of “dust samplers”
- **1916 – Sir Robert Kotze devised the Konimeter**
1919 – Konimeter adopted for routine work
- **1920 – 219 cases of Phthisis**
- **1930 – International Conference of Silicoses, Jnb. 13-27 August**
Convened by the international Labour Office of the League of Nations

- **1914 – Systematic dust sampling to be undertaken by a member of staff of the mine**
 - Official appointed must be called “Dust Inspector”
 - Directly responsible to the Manager
 - Granted a corresponding status of Senior Shift Boss

- **25 November 1944 – First draft constitution of 1st MVS**
- **1st Annual General Meeting took place on the 21st April 1945**
- **1953 – Mining groups employed 207 permanent vent officials & 37 LO's**
- **1975 – 1st International Mine Ventilation Congress**



Erasmus Commission of Inquiry into Occupational Health

(1975)

- ~ Most managers are not conscious of industrial health and are not committed to promoting the concept
- ~ The situation with regard to industrial hygiene is acute
- ~ The control of hazardous substances, and of gases and fumes being released, is inadequate
- ~ The training of industrial hygienists has been neglected

Leon Commission of Enquiry into Health & Safety in the Mining industry (1994)

“ The main emphasis and focus of occupational health activity on the mines has thus been on regulating the compensation for occupational diseases rather than the prevention thereof”

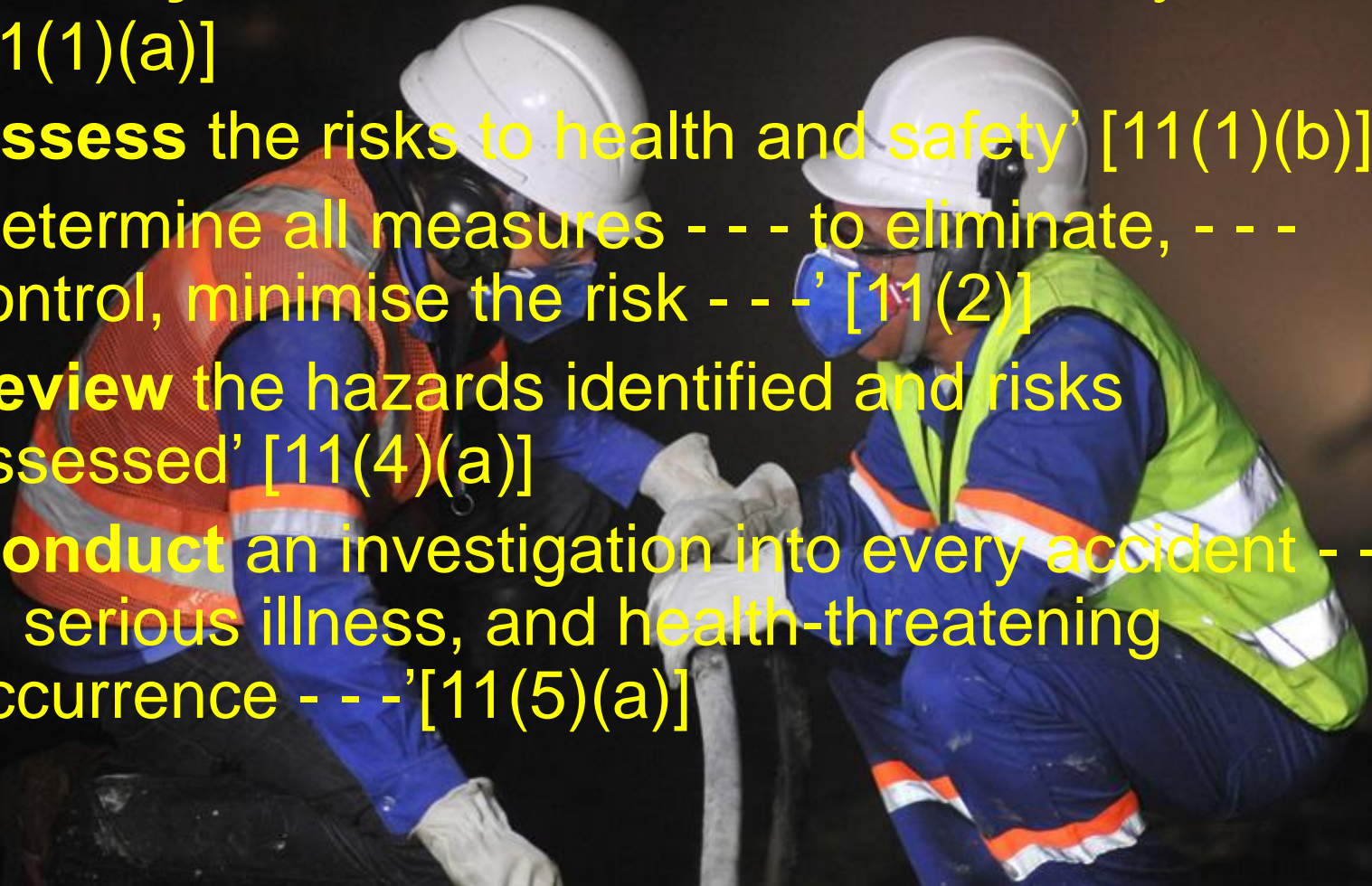
“ The Minerals Act focused predominately on the safety issues in the mining industry with no emphasis on promoting the occupational health status of workers”

RECOMMENDATIONS FROM THE LEON COMMISSION

- shaping occupational hygiene in the SA mining industry -

- **drafting of a new Mine Health and Safety Act to provide the comprehensive legal framework for creating a health and safe working environment**
- **promulgating of regulations and protective measures to protect the health of workers, incl. occupational hygiene and medical surveillance programmes**
- **ensuring appropriate training of all workers**

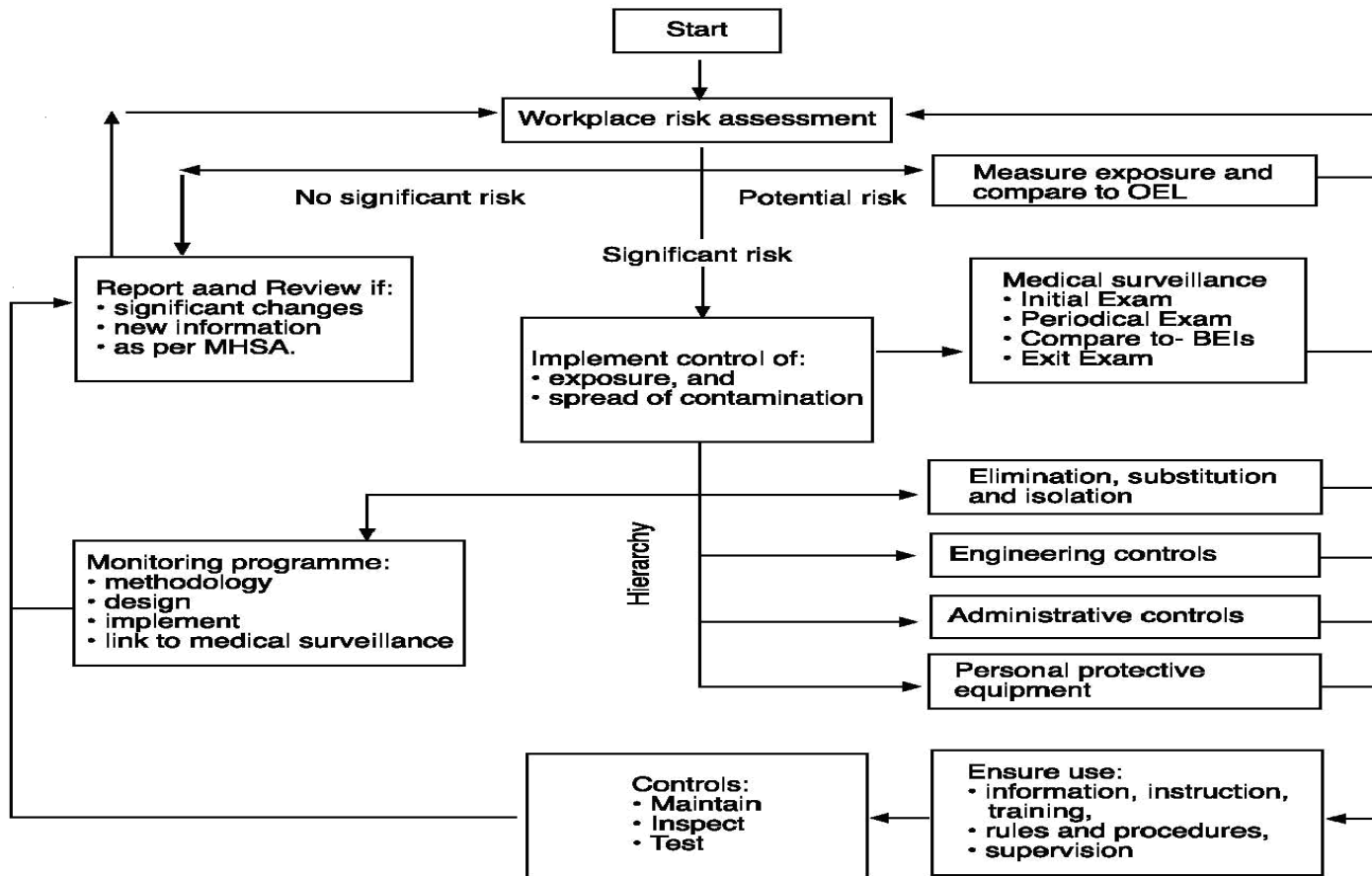
- **Precious Stones and Mineral Mining Rights Act of the Cape of Good Hope, Act 19 of 1883 – *Protection of life and limb***
- **Mines and Works Act, Act 13 of 1911**
- **Minerals Act, Act 50 of 1991**
- **Mine Health & Safety Act, Act 29 of 1996**
 - **Mine Environmental Engineering and Occupational Hygiene Regulations, July 2002**
 - **Amendment to the Regulations in respect of Occupational Hygiene, December 2005**
 - **Revised regulation 22.9(2)(a) – occupational exposure limits for airborne pollutants**

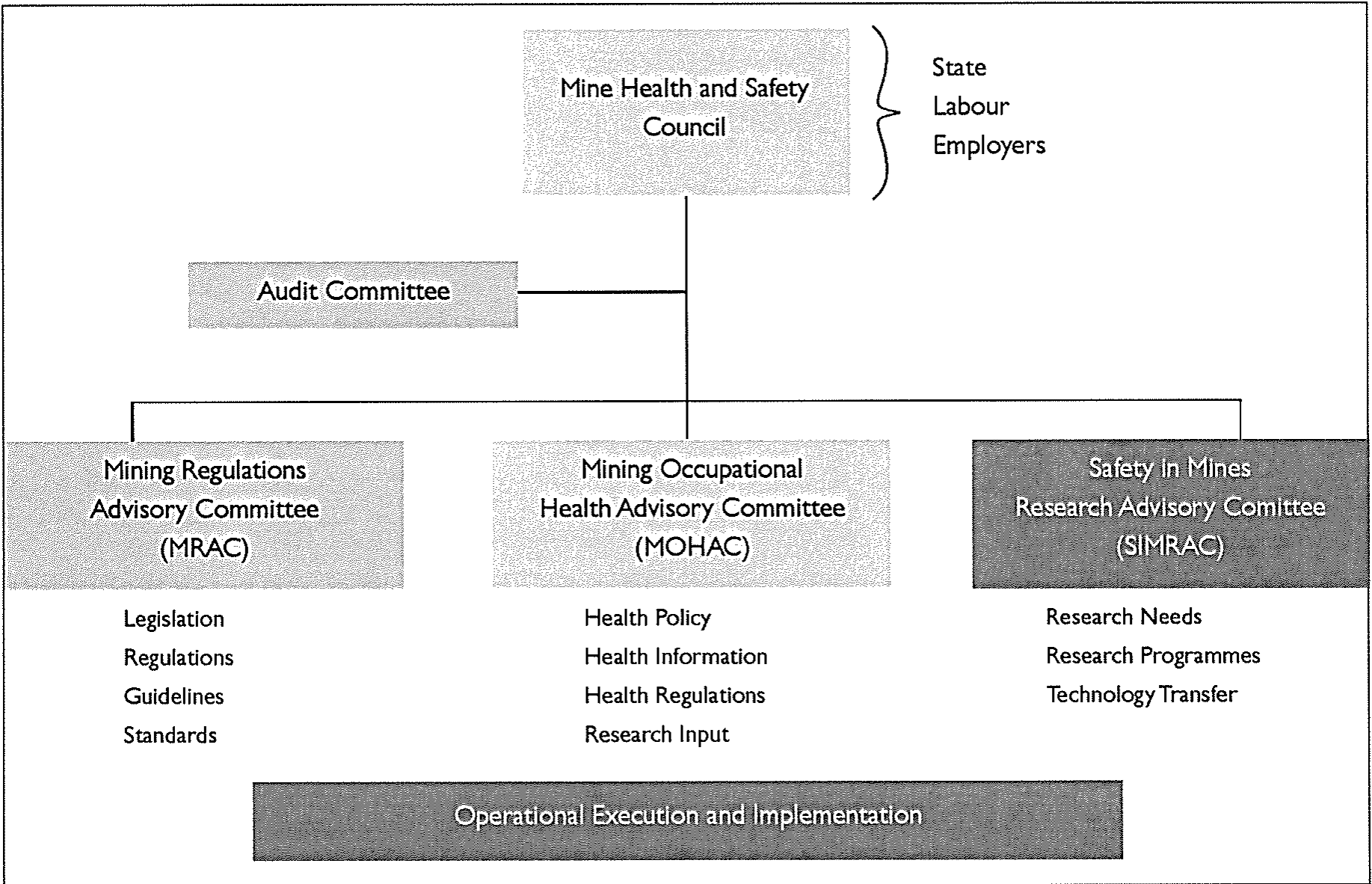
- **‘identify** the hazards to health and safety’ [11(1)(a)]
 - **‘assess** the risks to health and safety’ [11(1)(b)]
 - **‘determine all measures - - - to eliminate, - - - control, minimise the risk - - -’** [11(2)]
 - **‘review** the hazards identified and risks assessed’ [11(4)(a)]
 - **‘conduct** an investigation into every accident - - - , serious illness, and health-threatening occurrence - - -’ [11(5)(a)]
- 
- A photograph of two workers in a dark environment, possibly underground. They are wearing white hard hats, blue long-sleeved shirts, and high-visibility safety vests (one orange, one green). They are both wearing gloves and appear to be focused on a task, possibly inspecting or working on a piece of equipment or a pipe.

Occupational Hygiene

- Mines must use occupational hygiene techniques to measure levels of exposure to the hazards at the mine
- The mine must engage a qualified Occupational Hygienist to conduct the measurements
- System of measurements must provide information that would allow the employer to decide what measures to take to control or minimise the hazards concerned.
- All measurements must be recorded
- Measurements to be linked with each employee's record of medical surveillance

Occupational Hygiene Programme







SIMRAC had spend more than R300 million on over 300 projects since its establishment

HEALTH AND SAFETY IN WELDING AND ALLIED PROCESSES WITH PARTICULAR EMPHASIS ON WELDING FUME

David W. Stanton
Chamber of Mines of South Africa



Safety in Mines Research Advisory Committee
Facilitating safety and health research in the South African mining industry



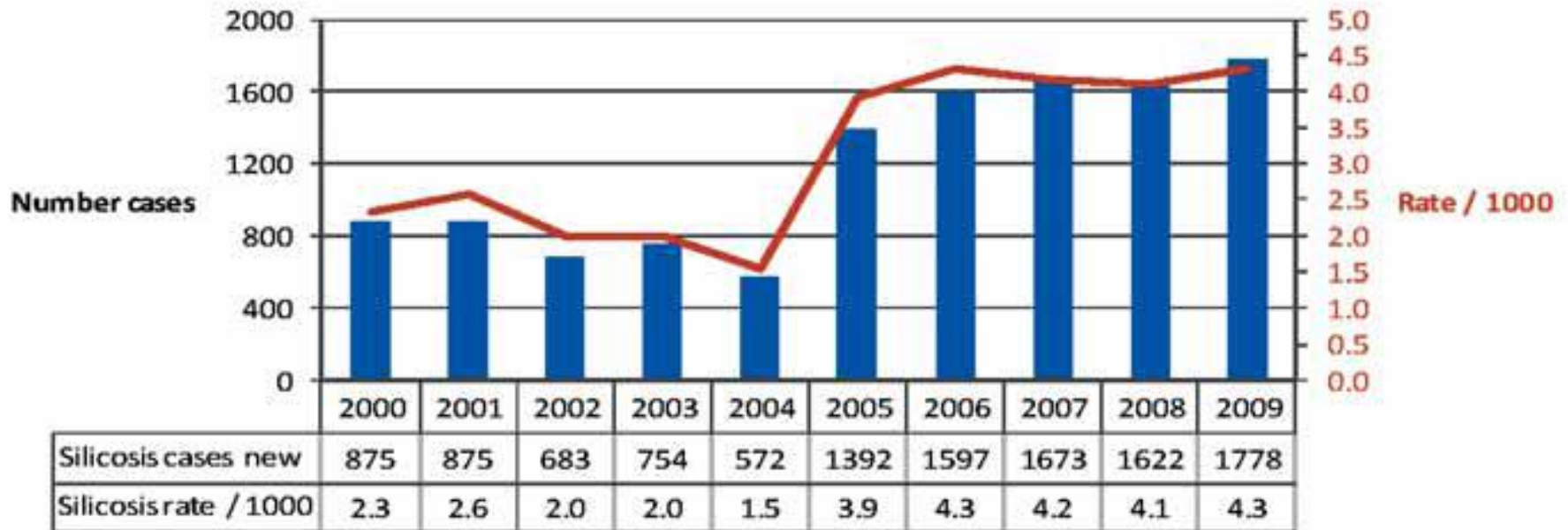
Southern African Institute of Training Excellence
July 2003



2.0

HOW ARE WE DOING?

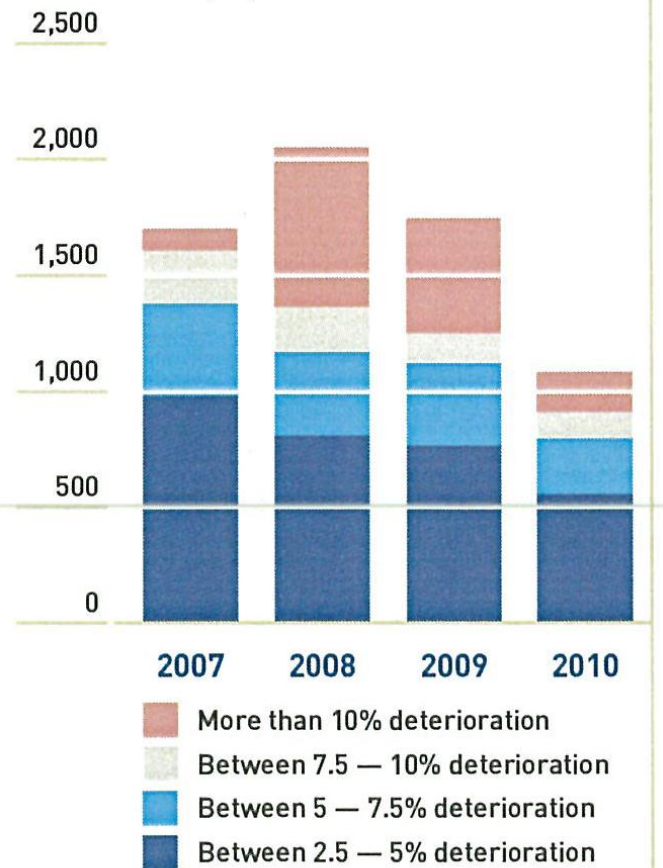
Silicosis cases all commodities



Source: Chamber of Mines

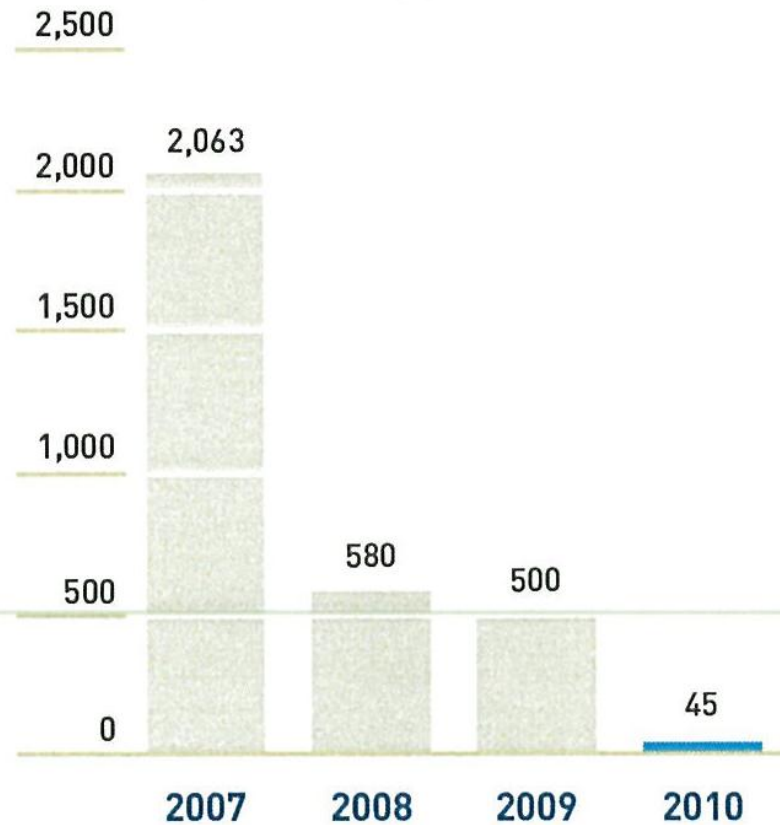
DETERIORATION OF HEARING FROM BASELINE

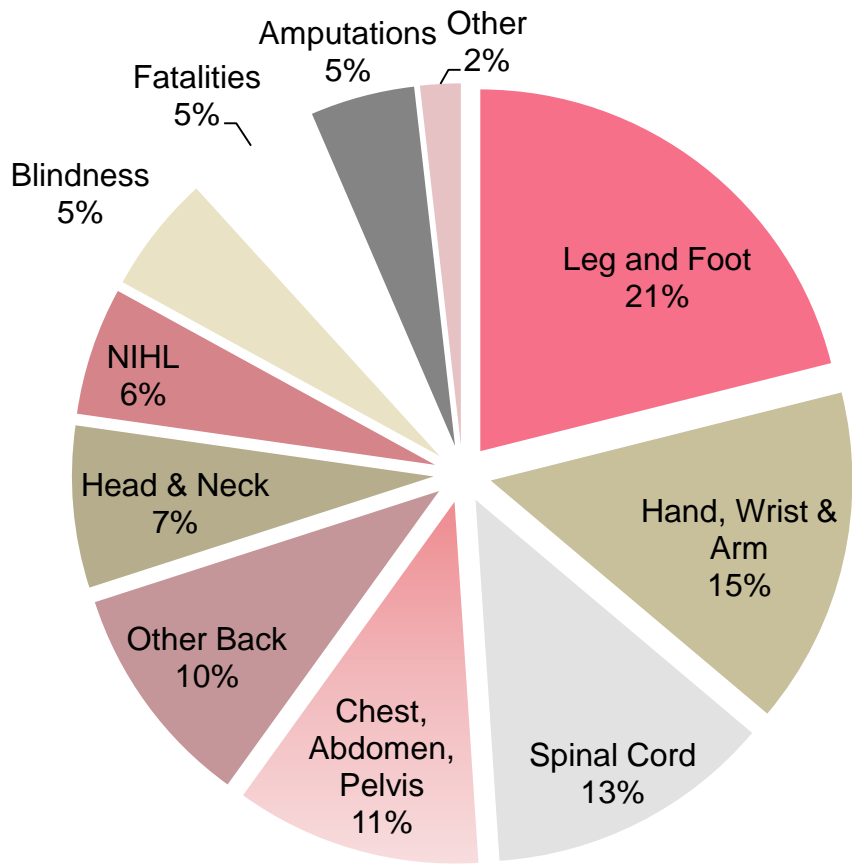
Number of employees



PIECES OF EQUIPMENT EMITTING >110 dB(A)

Number of pieces of equipment





10 reasons for poor Occupational Hygiene performance

Lack of
commitment

Poor
awareness

Weak
hazard ID

Low hazard
understanding

Systems
reactive

Inadequate
resources

Inadequate
liason between
teams

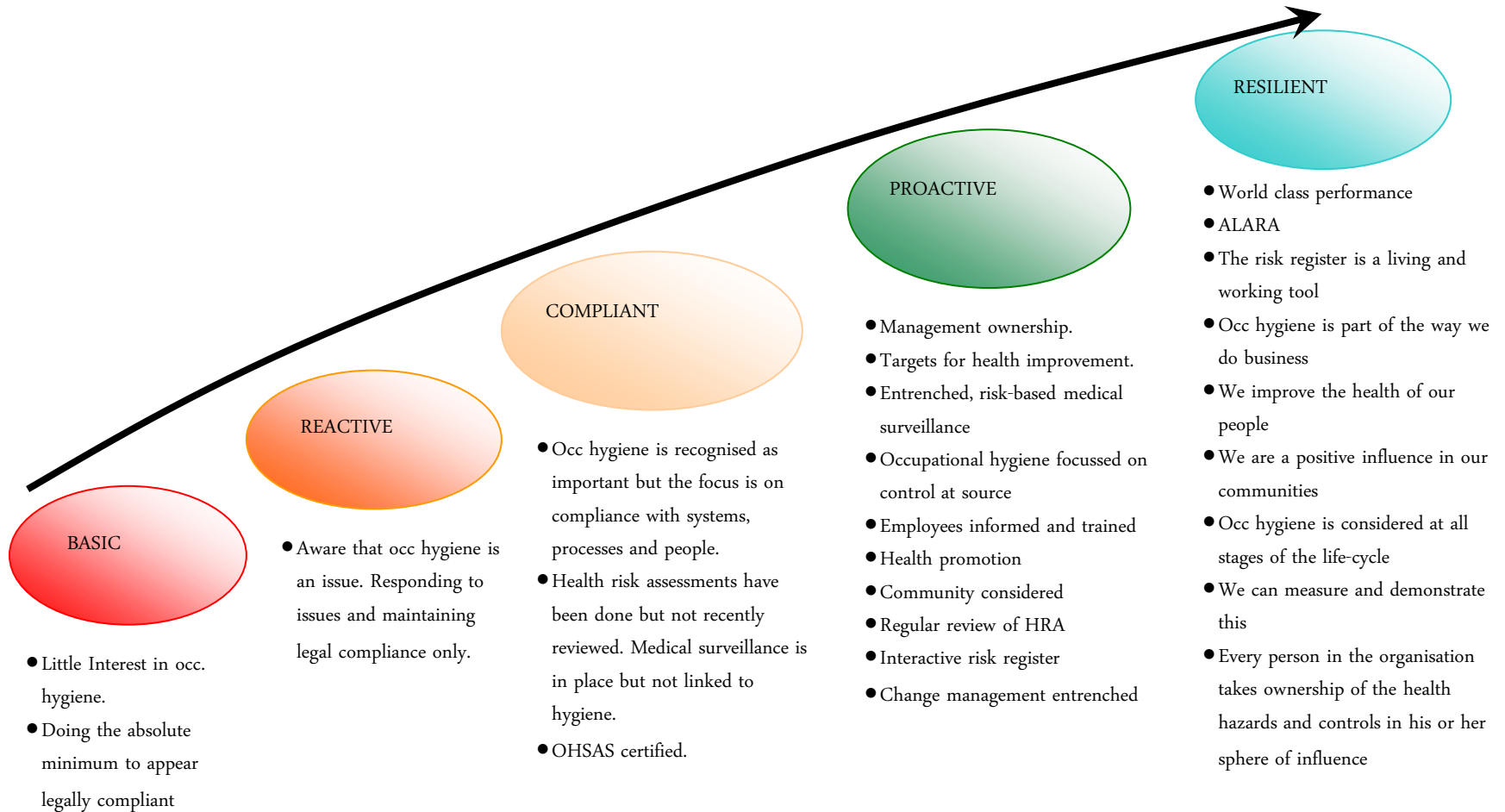
Poor record
keeping

Lagging
results

Unreliable
sampling

3.0

LOOKING FORWARD



Best Practice in occupational hygiene

- **Knowing the hazard (anticipating and identifying).**
- **Understanding the risk (quantifying).**
- **Managing the risk (control at source, elimination, substitution, process change etc.)**
- **Monitoring (occupational hygiene programmes, medical surveillance)**
- **Review (audit, management review)**
- **Continuous improvement**
- **Research**

❖ Risk assessment

- Identification and quantification of sources
- Identification of who is exposed, when (what tasks) and how much

❖ Education and training of employees

- The hazard
- How do you protect yourself
- What are the controls (what has management done to protect)
- Reporting of failures

❖ Controls based on hierarchy

- Control at source

❖ Monitoring and surveillance

- Monitoring of controls (are they working according to design)
- Monitoring of exposure
- Using incidents to help with monitoring

❖ Learning from incidents

- Results used to correct failures and improve maintenance
- Results used to identify new risks

- **Management is responsible and accountable**
- **Competent professionals engage in risk assessment, monitoring and control measures**
- **Training by correct department**
- **Everyone is involved in the process (a team effort to prevent harm)**



4.0

CHALLENGES

- **Management awareness of and commitment to occupational hygiene**
- **Resources**
 - **people & skills**
 - **equipment, instrumentation & laboratory services**
- **Primary focus on legal compliance rather than a pro-active approach to identifying and managing health risks**
- **Training & awareness**
- **Research**
- **Legislator**
- **International legislation (REACH, GHS, etc.)**
- **Revised international exposure limits, DNEL's, PNEL's, etc.**
- **Emerging risks**

- **Diesel Particulate matter**
- **Ultra-fine & nano particulates**
- **Vibration**
- **Radiation**
- **Repetitive strain (ergonomics)**
- **Fatigue**
- **Dermatitis**
- **TB & HIV**
- **Altitude**



**WHAT WE DO
TODAY WILL MAKE
A DIFFERENCE
TOMORROW**