

**XVth Anniversary Symposium of the International Association of Physicians in Audiology  
Notes for Structured session on “Noise-induced hearing loss protection”**

**Title: Hearing Conservation in the South African mining industry  
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Noise-induced hearing loss prevention in South African industry, specifically the mining industry, is regulated by the following standards and legislation:

- Mine Health and Safety Act (MHSA), 1996 (Act no. 29 of 1996);
- South African National Standards (SANS), 2004. SANS 10083:2004. the measurement and assessment of occupational noise for hearing conservation purposes, edition 5;
- Department of Minerals and Energy (DME),(2003). Mine Health and Safety Inspectorate guideline for the compilation of a mandatory code of practice for an occupational health programme (occupational hygiene and medical surveillance) for noise, DME 16/3/2/4-a3
- Department of Minerals and Energy (DME), (2000). Guideline for the compilation of a mandatory code of practice on Minimum Standards of Fitness to Perform Work at a mine. DME 16/3/2/3 – A1
- Schedule 3 of the Compensation for Occupational Injuries and Diseases Act (COIDA) with particular reference to Instruction 171
- Department of Minerals and Energy Guidelines for the compilation of a mandatory Code of Practice for Noise

The standards and regulations all refer to each other and in a nutshell:

- an **employer** must prepare and implement a Code of Practice (COP) on any matter affecting the health and safety of employees failure to do so is a breach of the MHSA and the employer could be liable to an administrative fine
  - an **employee** must take reasonable care to protect their own health and safety and the health and safety of other persons who may be affected by their conduct and failure to comply with a COP could result in a criminal charge.
- The mandatory code of practice for noise must include the following:
    1. The **outline of the structure of the hearing conservation programme** being implemented.
    2. Details of the **noise measurement for risk assessment** which requires:
      - Annual **personal exposure** measures representative of all full working shifts;
      - Activity noise** measurements with reference to:
        - the significant **noise sources** and workplace operations and activities that pose the greatest potential for exposure to noise;
        - the occupations and **number of employees** who are being exposed to significant noise levels i.e.  $\geq 82\text{dBL}_{\text{Aeq,8h}}$ ;
        - the **pattern** i.e. intermittent, continuous etc., duration and frequency of employee exposure to noise sources identified;
        - the control measures in place, i.e. substitution, engineering, administration (including education and training), noise demarcation zones, personal protective equipment.
    3. Details of the **Risk-based Medical Examination (RBME)**
      - The RBME for noise exposure consists of four elements, namely:
        - an assessment of the external ear canal (and, where possible, the middle ear) to establish eligibility for audiometry, i.e. a pre-audiometric medical examination;
        - an assessment of the external ear canal to establish compatibility with respect to HPDs, particularly insertable types;
      - in cases of significant hearing loss as demonstrated by records of previous audiometry, an assessment of any special needs with regard to HPD attenuation. Where low-attenuation

devices are indicated, their use would enhance the ability to communicate and hear warning signals while wearing HPDs in noise, and

- where the results of previous audiometry indicate extreme susceptibility to NIHL, a decision regarding the individual's further exposure to dangerous noise.

The RBME assessments should be done by a qualified person (e.g. an Occupational Health Practitioner), who should refer any concerns to the Occupational Medical Practitioner prior to audiometry or the issuing of HPDs.

4. Details of the policy on wearing of **hearing protection** equipment and the following requirements are stipulated:

- hearing protection equipment must comply with SANS 1451-1, SANS 1451-2 or SANS 1451-3
- hearing protection should be provided free of charge to employees working in a noise zone
- the wearing of hearing protection equipment should be compulsory for all persons entering a noise zone, i.e. an area where the 8 h rating level equals or exceeds 85 dBA, irrespective of how long they are to remain there
- the employer should ensure that hearing protection equipment ergonomically best suited to each specific employee is provided and that proper initial fitting takes place
- the wearing of hearing protection equipment by employees in the noise zone should be supervised and monitored by the employer
- information and training should be given to the employees regarding the proper use and maintenance of the hearing protection equipment issued to them
- the employer should ensure that all hearing protection equipment not in use is stored in a dust proof container in a place provided for such storage and maintained in accordance with the manufacturer's instructions

5. Details of the **medical surveillance programme**.

Noise is recognised as a "significant" hazard" where employees' equivalent exposure levels equal or exceed 50 per cent of the occupational exposure limit (OEL) of 85 dB, i.e. where the 8-h time-weighted average equivalent noise exposure level equals or exceeds 82 dB. In terms of the Occupational Hygiene Regulations 9.2(2) and the MSHA [9(1)-(6)], where a significant hazard is identified the employer is obliged to implement a mandatory code of practice, which would involve monitoring the hazard where the 8-h time-weighted average noise exposure level equals or exceeds 82 dB, and implementing medical surveillance where it equals or exceeds 85 dB.

The qualifications required for personnel performing various types of audiometry and providing medical opinions are:

*Baseline, periodic screening, monitoring and exit audiometry*

Audiometry for the abovementioned purposes may be conducted by any of the following individuals:

- An audiologist - a graduate in speech therapy and audiology or audiology,
- A medical specialist in otorhinolaryngology (an ear, nose and throat specialist),
- An occupational medical practitioner
- An audiometrist-a person registered with the Health Professions Council of South Africa as an audiometrist or as a hearing aid acoustician and who holds a certificate in audiometry issued by an institution recognised and approved by the Department of Labour or the Department of Minerals and Energy

*Diagnostic audiometry*

Diagnostic audiometry may only be performed by:

- An audiologist, or
- A medical specialist (in otorhinolaryngology)

*Medical opinion*

In complex cases or when a patient's permanent disability is expected to be more than 10 per cent, the medical opinion of a medical specialist must be obtained.

- In all other instances where the hearing loss is adjudged to be noise-related

The medical opinion of the occupational medical practitioner should be sought before referral for diagnostic audiometry. Diagnostic audiometry must be performed by either an audiologist or a medical specialist. The subject must not have been exposed to noise levels in excess of 85 dBA during the 16 hours immediately preceding diagnostic evaluation, a requirement that cannot be met through the use of hearing protection devices. Diagnostic evaluations must include pure-tone air conduction, as well as bone conduction audiometry. Additional techniques such as narrow-band or speech discrimination audiometry may also be used where indicated. Two diagnostic audiograms must be recorded during two different sittings, which may take place on the same day. If the two audiograms differ by more than 10 dB for either ear at any of the mandatory test frequencies, a third audiogram must be conducted during a third sitting to obtain consistent results. Should the third audiogram also indicate inconsistencies greater than 10 dB, the subject

should be re-evaluated in six-months. Where consistent audiograms are not obtained, even after six months' time, the subject may be referred for specialist evaluation to assess hearing loss.

The audiologist or medical specialist performing diagnostic audiometry should refer to provisions in the Compensation Commissioner's Internal Instruction, "The Determination of Disability in Cases of Noise-induced Hearing Loss".

### **Compensation**

Instruction 171 of the COIDA requires that the hearing threshold levels for 500Hz, 1000Hz, 2000Hz, 3000Hz and 4000Hz of both ears are used to calculate the Percentage Loss of Hearing (PLH) for the employee. The PLH is calculated using acturial tables weighted in the speech frequencies. A deviation from a baseline PLH of 10% constitutes a compensable loss. The compensated PLH becomes the new baseline. The PLH shift over a working career is apportioned to the relevant employer. Compensation is calculated based on the current earnings of the employee. One hearing aid is supplied to the compensated employee every five years if he complies with the criteria of a Speech recognition threshold of greater than 40 dB.

### **Minimum Standards of Fitness to Perform Work at a mine**

The Guideline for the compilation of a mandatory code of practice on Minimum Standards of Fitness to Perform Work at a mine requires that the an ear, nose and throat examination is required (which includes intact tympanic membranes and functioning eustachian tubes) and the minimum standards set below must be met for occupations involving changes in barometric pressure and /or exposure to noise.

- Audiometric standards
  - Pure tone audiometric screening at 0,5 kHz, 1 kHz, 2 kHz and 3 kHz must meet the following criteria:
    - AGE 16-39: pure tone average of 15 dB or less;
    - AGE 40 AND ABOVE: Pure tone average of 25 dB or less;
    - IRRESPECTIVE OF AGE: a threshold of 45 dB or less at 3 kHz.
- Hearing Aids
  - The use of a hearing aid by those working in a designated noise zone should not be permitted.