MOSH Noise Adoption Team – Leading Practice

Hearing Protection Devices – Training, Awareness and Selection Tool

Of all the possible safety topics, hearing conservation is the most difficult. The reason for this is that there is no pain associated with hearing loss. In fact, people actually enjoy loud noise that damages their hearing! It is by no means an easy task to convince people to wear, what is often perceived as, uncomfortable PPE, especially when they cannot immediately feel or see the benefits. There is only one way to do this so that a willingness to comply is created, and that is to ensure that the employee fully understands the working of the ear, how the ear is damaged, that noise induced damage is irreversible and totally isolates one from the world.

Despite ongoing efforts to improve the effectiveness of mine hearing conservation programmes (HCPs), noise-induced hearing loss (NIHL) has cost the South African mining industry in excess of R890 million in compensation claims alone from 1997 to 2007 (Kritzinger, 2009) and this does not take into account the impacts on productivity/profitability and mineworkers' quality of life.

The Mine Health and Safety Council (MHSC) Prevention of NIHL programme initiated Track C (SIM 050501) to address the needs of stakeholders in the mining industry when implementing HCPs.

Previous SIMRAC projects dealing with occupational noise have included GEN 011 (1997) and more recently, Health 806 (Franz, 2005), which incorporated guidelines for best practice in the implementation and management of mine HCPs. **Even with initiatives to reduce noise emission through engineering measures, personal protection will continue to be an important means of limiting NIHL risks to**

mineworkers. Both of the abovementioned projects emphasised the need to improve mineworkers' knowledge of NIHL and awareness of noise as a hazard, as well as to improve their motivation to comply with safe work practices that include the correct use of hearing protection devices (HPD).

Given the need to enhance the effectiveness of awareness and training materials and mine personal protection strategies while more systematic control measures are being implemented, this Leading Practice has as its primary outputs;

1. Updated multimedia training, educational, awareness and motivational materials for the prevention/elimination of noise-induced hearing loss (NIHL), aimed at all levels of mine employees, particularly mineworkers, comprising of;
    a. A video programme in English, Xhosa, South Sotho and Zulu for coal, gold and platinum mines:
        i. Module 1: Educational/Motivational (15 minutes long), which conveys the message that loud noise is hazardous and illustrates the potential consequences of exposure;
        ii. Module 2: HPD training (10 minutes long), which reinforces educational and motivational aspects from Module 1 and demonstrates the correct use and care of various types of hearing protection devices (HPDs);
    b. Handouts for trainees in the form of 16-page A-5 self-cover booklets illustrating the risks of excessive noise exposure, as well as the correct use and care of HPDs, produced in English and Zulu;
    c. Four volumes of guidelines for trainers, comprising of:
        i. A script for induction talks on the noise hazard, with a demonstration of the benefits of using HPDs in noisy areas and their correct use and care, with four supporting overhead transparencies;
        ii. Use of the training videos, with the scripts for Modules 1 and 2 appended;
        iii. Use of the handout booklet, with a reproduction of the booklet appended; and
        iv. Suggestions for ways of responding to reasons or excuses commonly given by mineworkers who neglect to use HPDs.

d. Compilation of frequency-specific attenuation data for all currently available HPDs for noise associated with various occupations, workplaces and machinery in the mining industry.
e. Other materials available from local and international sources comprising of;
    i. PowerPoint® presentation – Hearing Conservation – Stick to Basics
    ii. The NIOSH Hearing Loss Simulator
    iii. Noisemeter.exe

1 HPD selection tables

Gen 011 (Franz et al., 1997) measured the noise exposure levels of employees in different occupations in the coal, gold and platinum mining industry. HPD selection tables were developed on the basis of the noise exposure levels of the occupations sampled. The HPDs that were listed in the selection tables were those available in South Africa in the mid-1990s. In order to make the NIHL prevention tools available to the mining industry relevant and up-to-date, the MHSC included the updating of this valuable HPD selection tool as part of the SIM 050501 Prevention of NIHL programme.

The research team used the web-based National Institute of Occupational Safety and Health (NIOSH) tool as the basis of the updating process. Information about all the HPDs on the NIOSH website that are available in South Africa were collected and used to develop an updated list of HPDs for 2009. The frequency-specific attenuation data supplied by the HPD manufacturers and suppliers was incorporated into the HPD selection tables available from GEN 011. The HPD selection tables were further updated by formulating the tables into a user-friendly Excel®-based version of a selection table for each occupation. The HPD selection tables indicate:

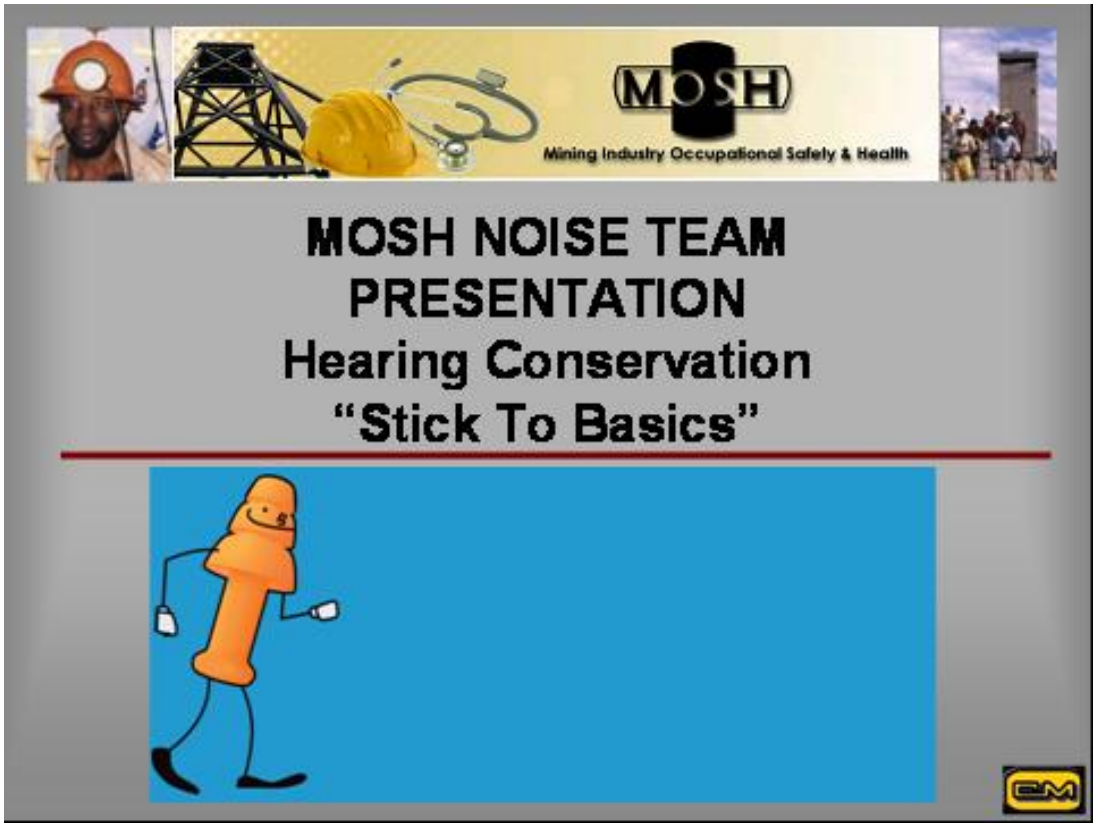
- the expected noise exposure levels as measured by GEN 011
- the average effective attenuation for each HPD available
- whether the resultant average noise exposure with HPDs will result in noise exposure levels of above the Occupational Exposure Level (OEL)
- if the average expected attenuation is likely to interfere with speech communication as a result of overprotection by the HPD.

The tool includes;

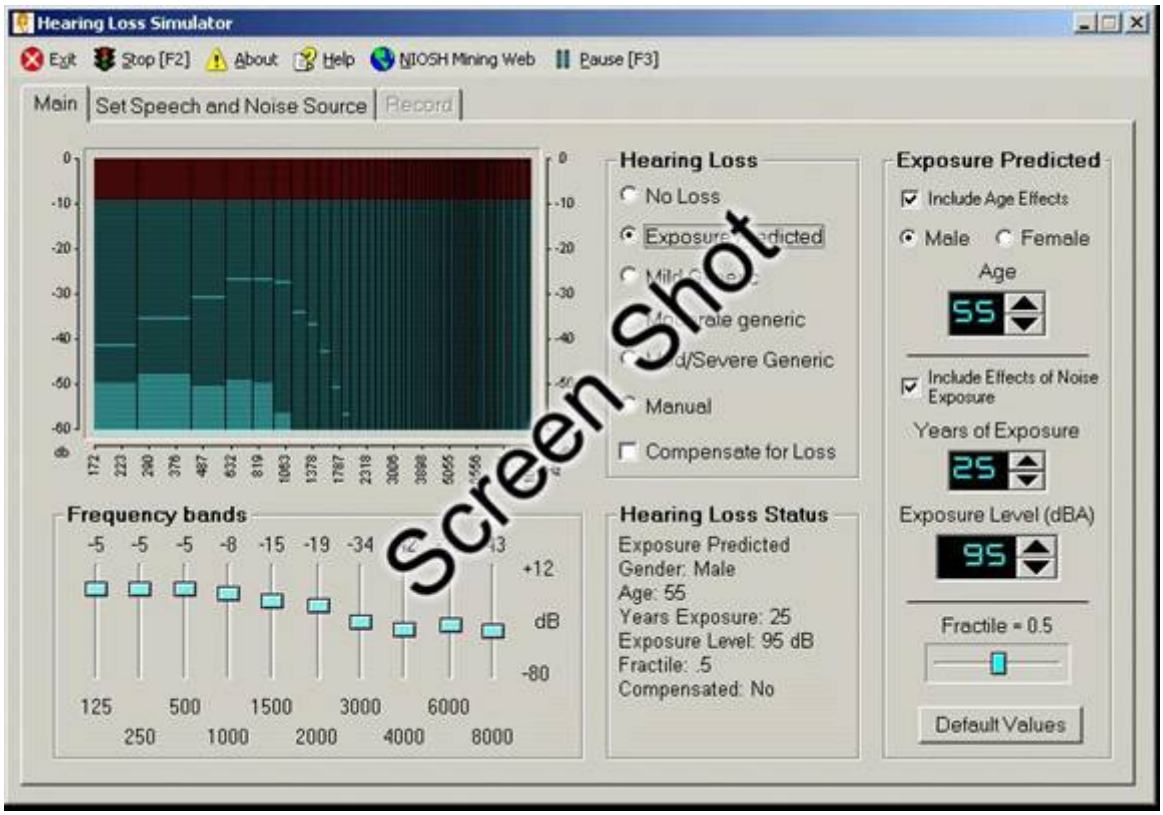
- A list of 97 HPDs available in South Africa in 2009, with tables indicating the effective attenuation that can be expected from each HPD at each central frequency;

- Guidelines for the use of the HPD selection tables;
- Coal mining occupations in surface workshops and general coal mining; and
- Gold and platinum mining occupations, which include the surface workshops, surface plants and conventional or mechanised mining.
- The effect of wear time;
    - when considering HPD's with High and Low NRR Values
    - on the Percentage Risk of Obtaining NIHL
- Cost associated with Hearing Impairment

2 PowerPoint® presentation – Hearing Conservation – Stick to Basics



3 NIOSH Hearing Loss Simulator



The NIOSH Hearing Loss Simulator is a software training and communication tool for promoting hearing conservation. It allows a user or trainer to demonstrate the effects of noise exposure on hearing without experiencing an actual noise-induced hearing loss. Estimates of the effects of different levels of noise exposure are based on the *American National Standard Determination of Occupational Noise Exposure and Estimation of Noise-Induced Hearing Impairment* otherwise known as ANSI S3.44. This standard specifies the predicted hearing loss for noise-exposed populations of individuals on the basis of risk factors that include sex, age, exposure levels (in A-weighted decibels or dBA), and years of exposure.

4 NIOSH Noise Meter

The NIOSH Noise Meter is a software training and communication tool for promoting hearing conservation. It allows a user or trainer to demonstrate to the trainees the different sounds and sound intensities of everyday objects.

5 Noise Adoption Team HPD_TAS_Tool

The Noise Adoption Team HPD – Training, Awareness and Selection Tool is therefore included in the leading practice as a user-friendly Excel®-based version, with the objective of assisting Health and Safety Practitioners in ensuring that the correct HPD is made available to the various end users in the mining industry. It is envisaged that through the demonstration and the eager adoption of this leading practice, the challenge of significantly reducing NIHL, a severe and irreversible injury, can be met.