



Programme-Based Engagement

Technical Advisory for Work in Noisy Environment

- *Hearing Conservation Programme*

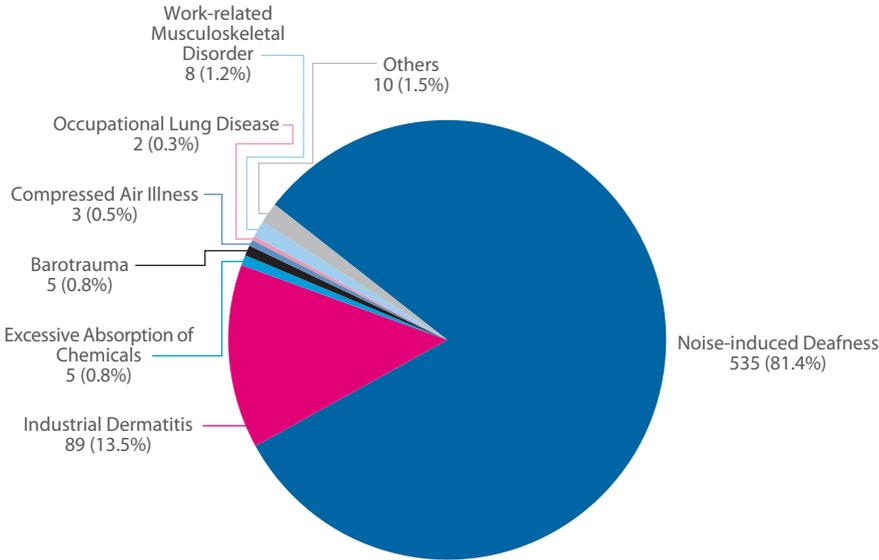
WSHAC

WORKPLACE SAFETY AND HEALTH ADVISORY COMMITTEE

1. Introduction and Background

Noise is generated by many industrial processes and work activities. Prolonged exposure to excessive noise can cause noise-induced deafness (NID). NID refers to a permanent loss in hearing sensitivity, which can lead to communication difficulties, social isolation and degradation in the quality of life.

An increase in the number of NID cases has been observed, with 2006 statistics showing a 37% increase from 2005. A break down of occupational disease types shows that NID accounts for 81.4% of all occupational diseases reported in 2006.



Distribution of Occupational Diseases by Type, 2006

To protect employees from NID, every workplace with a noise hazard should implement a comprehensive Hearing Conservation Programme (HCP), as part of the function of the company’s overall safety and health programme.

Objective of HCP

To minimise the risks associated with occupational noise exposure, in order to prevent NID.

Requirement for HCP

Your workplace will require a HCP when any person in the workplace is exposed to excessive noise, which is defined as an equivalent sound pressure level of 85 dB(A) or more, over an 8-hr work day.

2. Planning for HCP

Establishment of a HCP team

- The composition and size of the team should be proportionate to the size of the company and the number of employees exposed to excessive noise.

Take Note!

- The key members of the HCP team are your employees. Their support and participation is critical to the success of the programme.

Appointment of a HCP administrator

The HCP administrator should co-ordinate all aspects of the programme. The administrator should possess knowledge of:

- Individual elements of the HCP
- Relevant provisions of the legislation
- Effects of noise on hearing
- Purpose of hearing protectors and audiometric examinations

Development of a HCP policy

- The employer, in consultation with the employees, should develop a written HCP policy.
- The policy should be endorsed by top management to ensure commitment to its implementation.

3. Elements of HCP

Identification of noise hazard and evaluation of the risks involved

- Employers, principals and self-employed persons should conduct a risk assessment for all noisy work processes and activities. The basic steps of conducting the risk assessment are:

Step 1: Identify Noise Hazards

Qualitative Identification

- Conduct initial assessment using a checklist or by doing a site visit.
- If the results of the qualitative hazard identification suggest that noise hazards are present, proceed to perform quantitative hazard identification.

Quantitative Identification

- Conduct noise monitoring to identify employees who are exposed to excessive noise.
- This should be conducted by a competent person using suitable and properly calibrated noise measuring equipment.

Step 2: Evaluate Noise Risk

- Evaluate the risks associated with the identified noise hazards to determine if it is acceptable or if control measures are needed.
- The risks of developing NID depends on the noise exposure level:

Average noise exposure (dBA)	Risk of NID (%) *
80	1
85	8
90	25

* The number of employees who will develop NID in every 100 occupational noise-exposed population.

Source: *Criteria for a Recommended Standard, Occupational Noise Exposure, Revised Criteria 1998; Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health, USA*

Step 3: Control Noise Risk

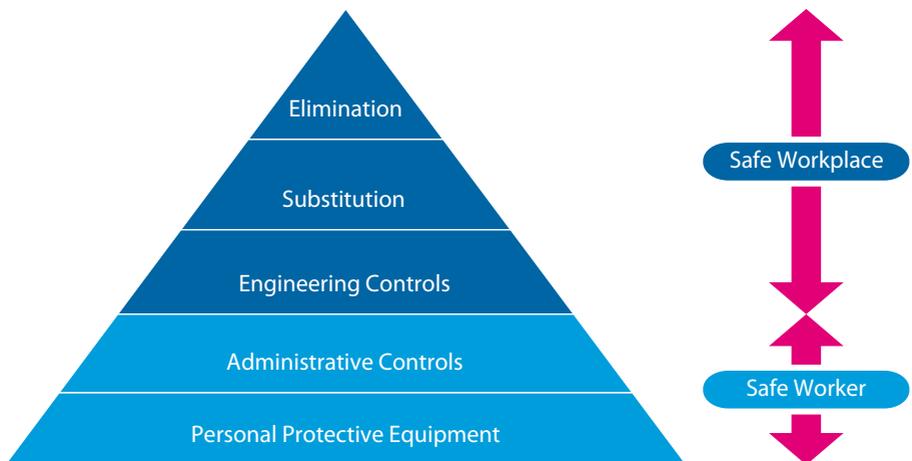
Take practicable measures to reduce or control noise from machinery, equipment or work processes so that no employees are exposed to excessive noise.

Implementation of noise control measures

- Appoint a competent person to advise on the proper noise control measures if 50 or more persons at the workplace are exposed to excessive noise.
- From the results of the risk assessment, establish and implement a noise control plan to reduce the excessive noise or minimise the noise hazard.

Take Note!

- Noise emission levels should be considered during the selection and procurement of new machines.
 - Employees, particularly those who are directly affected by the noise hazards, should be encouraged to participate in the development of the control measures to ensure that the measures put in place are practical and will not interfere with their work.
 - The noise control plan should be endorsed by top management to ensure commitment to its implementation.
- Where noise hazards have been identified at the workplace, consideration of risk control measures to be adopted should follow the hierarchy below:



Substitution

This involves the replacement of a noisy process or equipment with a quieter alternative.

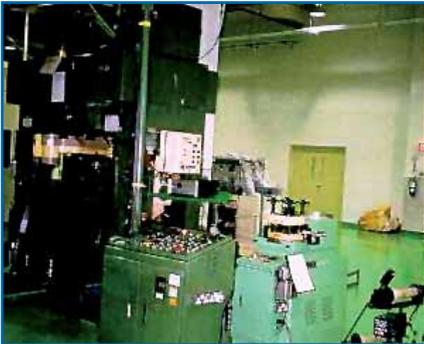


The jack hammer (left photo) was substituted with an automated machine (right photo) to break down the concrete wall. The noise level was reduced from 90 dBA to 83 dBA.

Engineering Controls

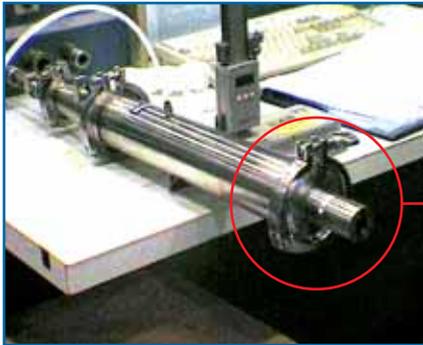
The following are examples of engineering noise controls:

- Acoustic enclosure



The noise generating stamping machine (left photo) was completely enclosed (right photo) to reduce the noise level. The noise level was reduced from 95 dBA to 78 dBA.

- Silencers or muffler



The expansion chamber (right photo) was installed at the outlet of the calibration nozzle (left photo) to reduce the noise generated by the air jet at the nozzle. The noise level was reduced from 112 dBA to 80 dBA.

- Noise barriers
- Vibration isolation
- Personal enclosure

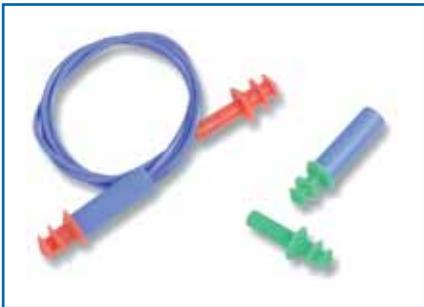
When the implementation of engineering controls is not reasonably practicable, administrative controls should be implemented to reduce noise exposure by:

- Shortening the length of time a person is exposed to excessive noise by job rotation.
- Scheduling machine operating times to reduce the number of persons exposed to excessive noise.

Take Note!

- Noise monitoring should be performed after noise control measures have been implemented to evaluate the residual risk.
- A maintenance programme should be established to ensure that all noise control systems or devices remain effective and do not deteriorate over time.
- The proper use of the noise control devices should be communicated to the employees to ensure that the controls are kept in good condition.

Provision of suitable hearing protectors and ensuring their usage



- Hearing protectors serve as an interim solution to reduce noise exposure before engineering and administrative controls are administered, or when controls are not feasible.
- Hearing protectors can also be used to provide additional protection on top of the other control measures.
- Establish and implement procedures to ensure that:
 - Hearing protectors are properly issued and maintained.
 - Persons exposed to excessive noise use hearing protectors consistently and are instructed on the proper use of hearing protectors.
- Provide employees with a range of hearing protectors to allow choice of the most appropriate one.
- Promote the wearing of hearing protectors at the workplace by requiring all personnel including the managers, supervisors and visitors to wear the protectors at all times when in the hearing protector areas.

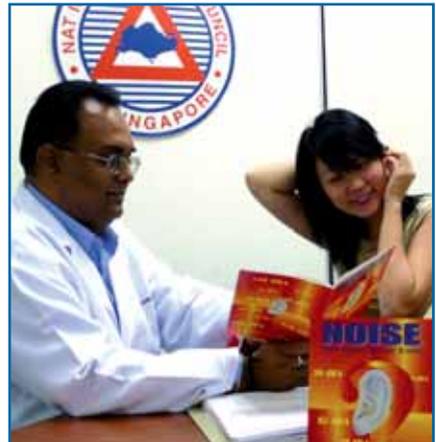
- Ensure that the hearing protectors are readily available such that employees can replace their hearing protectors when necessary.
- Place warning signs indicating the use of hearing protectors at all entrances to work areas where employees are exposed to excessive noise.

Take Note!

- Improper wearing of hearing protectors can lead to diminished hearing protection.
- Removal of hearing protectors for even a short period of time can significantly reduce their effectiveness and result in inadequate protection.
- Damaged hearing protectors can result in improper fit.

Training and education

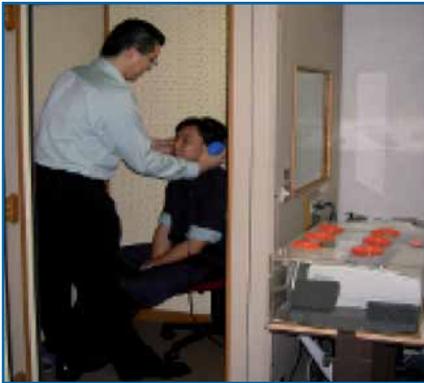
- Conduct training every 3 years for all employees who are exposed to excessive noise, and within 3 months of job commencement for new employees.
- The training programme should include the following topics:
 - Relevant provisions of the legislation
 - Effects of noise on hearing
 - Results of risk assessment and noise monitoring
 - Purpose of hearing protectors and their proper use and maintenance
 - Purpose and procedure of audiometric examinations
- Inform employees of the progress of the HCP implementation.
- Encourage employees to provide feedback on the HCP.



Take Note!

- All training should be conducted in a way your employees can be expected to understand, with special consideration for the language capability of individual employees.
- The training content should be reviewed periodically.

Conduct annual audiometric examinations



- All employees who are exposed to excessive noise should be examined by a Designated Factory Doctor to detect any early hearing impairment.
- Annual audiometric examinations should be conducted for all employees who are exposed to excessive noise and the examinations should be performed by competent persons.

Points to note for audiometric examination

- Employees should not be exposed to noise for at least 16 hours before the audiometric examination.
- If this is not possible, employees should be instructed to wear hearing protectors all the time during the period of exposure before the audiometric examination.

Take Note!

- The results of the audiometric examinations should be communicated to employees.
- Counseling should be provided to employees who show significant change in hearing loss. They should also be informed of the preventive measures that they can take to avoid further hearing loss.

- NID is a reportable occupational disease. Employer must notify all NID cases to the Commissioner for Workplace Safety and Health via the website:

<http://www.mom.gov.sg/iReport>

Keeping of records related to HCP activities

Records such as noise monitoring records, risk assessment forms, training records, noise control plans, documents on hearing protector issuance and fitting and audiometric test records, should be kept and made available for review.

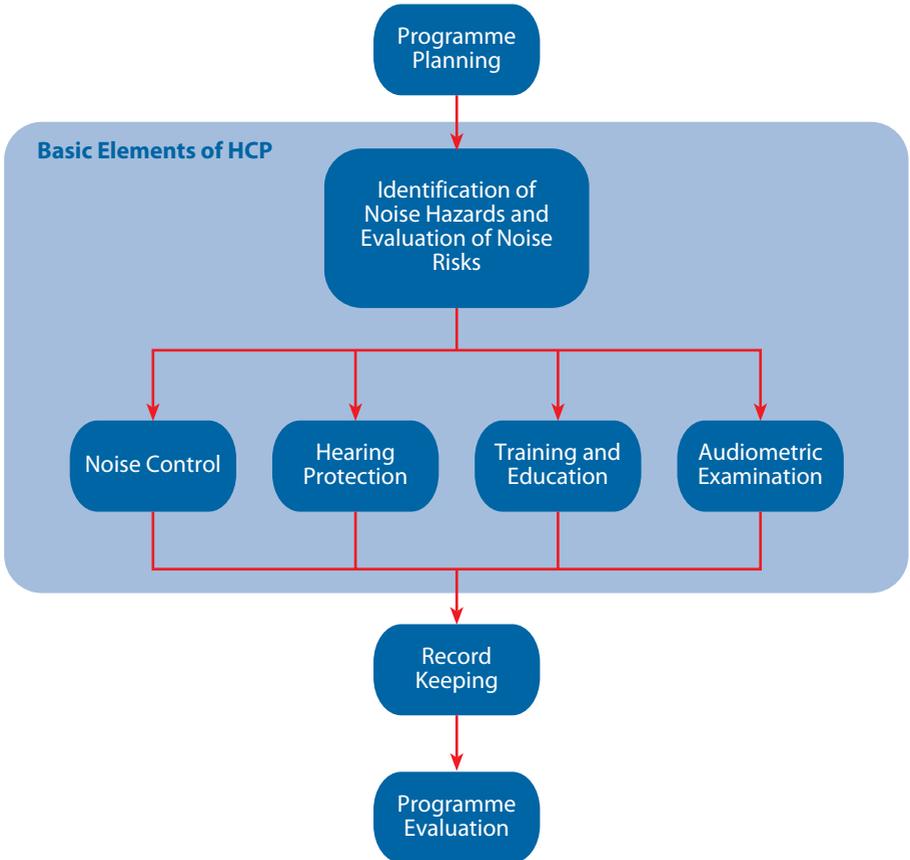
Evaluation of HCP to determine its effectiveness and areas for improvements

- Conduct periodic evaluation of the HCP to determine its effectiveness in preventing NID:
 - Assess the completeness and quality of the programme elements using the HCP evaluation checklist.
 - Evaluate the audiometric results to determine the effectiveness of the HCP in preventing NID.
 - Encourage employees to provide feedback on the merits or shortcomings of the programme and to offer suggestions on improvements to the HCP.
- Take appropriate steps to address the deficiencies identified.

Strong management commitment and active employee participation are critical for the success of the HCP. Management should take the appropriate steps to encourage employees' participation in the development and implementation of the HCP.

An overview of the HCP is shown in the flowchart below:

Hearing Conservation Programme for Managing Noise Risks



4. References

Code of Practice (CPs)

- CP76 – Code of Practice of the selection, use, care and maintenance of hearing protectors
- CP99 – Code of Practice for industrial noise control

The CP can be obtained from:

SPRING Singapore
Information Resource Centre
2 Bukit Merah Central, #04-00
Singapore 159835
Tel: (65) 6279 3920
Fax: (65) 6377 0669
Email: knowledge@spring.gov.sg

Guidelines

- Guidelines for Hearing Conservation Programme
- Guidelines for Noise Control and Vibration

The above guidelines are available for download at:

http://www.mom.gov.sg/publish/momportal/en/communities/workplace_safety_and_health/building_capabilities/Managing_Workplace_Hazards_/Noise_and_Vibration.html

List of competent persons

The lists of service providers for noise monitoring, noise control, hearing conservation programme training and audiometric examinations are available at:

http://www.mom.gov.sg/publish/momportal/en/communities/workplace_safety_and_health/service_and_equipment/list_of_other_service.html

5. Contacts

To find out how you can make your workplace safer and healthier, log on to www.wsh.sg.
You may email your queries or suggestions to enquiries@wsh.sg

To report unsafe workplaces please call the OSH hotline at 6317 1111

To report accidents, dangerous occurrences and occupational diseases please log on to
www.mom.gov.sg/ireport

**Reprinted in November 2007.
Published in September 2007 by the Workplace
Safety and Health Advisory Committee in
collaboration with the Ministry of Manpower.**

All rights reserved. This publication may not be reproduced or transmitted in any form or by any means, in whole or in part, without prior written permission. This document is available on the Workplace Safety and Health Advisory Committee website: www.wsh.sg