

Australian/New Zealand Standard™

Occupational noise management

Part 2: Noise control management



AS/NZS 1269.2:2005

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STANDARDS AUSTRALIA/STANDARDS NEW ZEALAND

RECONFIRMATION
OF
AS/NZS 1269.2:2005
Occupational noise management
Part 2: Noise control management

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Technical Committee AV-003 has reviewed the content of this publication and in accordance with Standards Australia procedures for reconfirmation, it has been determined that the publication is still valid and does not require change.

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NOTES

Australian/New Zealand Standard™

Occupational noise management

Part 2: Noise control management

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PREFACE

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee AV-003, Acoustics, Human Effects, to supersede, AS/NZS 1269.2:1998, *Occupational noise management, Part 2: Noise control management*.

This is Part 2 in a series of Standards as follows:

AS/NZS

1269	Occupational noise management
1269.0	Part 0: Overview and general requirements
1269.1	Part 1: Measurement and assessment of noise immission and exposure
1269.2	Part 2: Noise control management (this Standard)
1269.3	Part 3: Hearing protector program
1269.4	Part 4: Auditory assessment

The objective of this series of Standards is to provide requirements and guidance on all facets of occupational noise management. It is recommended that the reader refer to all Parts of AS/NZS 1269 to better understand all relevant terminology and objectives of occupational noise management.

The objective of this Part is to give requirements and guidance on the management of noise control in workplaces. It provides procedures for noise control in existing workplaces as well as for incorporating noise control in the design of new workplaces.

The objective of this revision is to confirm the existing Standard with a few minor changes.

The guidance provided in this Standard is based on ISO 11690-1:1996, *Acoustics—Recommended practice for the design of low-noise workplaces containing machinery*, Part 1: *Noise control strategies*, ISO 11690-2:1996, *Acoustics—Recommended practice for the design of low-noise workplaces containing machinery*, Part 2: *Noise control measures*, National Occupational Health and Safety Commission (Worksafe Australia) documents and WorkSafe Western Australia documents.

The term ‘informative’ has been used in this Standard to define the application of the appendix to which it applies. An ‘informative’ appendix is only for information and guidance.

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Australian/New Zealand Standard
Occupational noise management

Part 2: Noise control management

SECTION 1 SCOPE AND GENERAL

1.1 SCOPE

This Standard provides requirements and guidance on the management of noise control in occupational settings and applies to all types of workplaces and to all types of sounds.

Sections 2, 3 and 4 are respectively concerned with procedures for incorporating noise control in the design of new workplaces, the implementation of noise control procedures in existing workplaces and the provision of complementary technical information on basic noise control techniques applicable to both new and existing workplaces.

1.2 REFERENCED DOCUMENTS

The following documents are referred to in this Standard:

AS

- 2659 Guide to the use of sound measuring equipment
- 2659.1 Part 1: Portable sound level meters
- 2659.2 Part 2: Portable equipment for integration of sound signals

AS/NZS

- 1269 Occupational noise management
- 1269.0 Part 0: Overview and general requirements
- 1269.1 Part 1: Measurement and assessment of noise immission and exposure

NOHSC

Worksafe Australia, Noise Management at Work—Control Guide, 2nd Edition. Sydney, National Occupational Health and Safety Commission, 1991.

1.3 DEFINITIONS

For the purpose of this Standard, the definitions given in AS/NZS 1269.0, AS/NZS 1269.1 and those below apply.

1.3.1 Administrative noise control

A control measure (not including the use of a personal hearing protector) that reduces the noise to which a person is exposed by means of work arrangements, including—

- (a) the scheduling of work;
- (b) job rotation;
- (c) limiting the entry of people to areas with excessive noise; and
- (d) the observance of quiet work practices.

1.3.2 Engineering noise control

A control measure (not including the use of a personal hearing protector) that reduces the noise to which a person is exposed by the design or modification of equipment or the physical working environment, including—

- (a) eliminating noisy equipment;
- (b) replacing noisy equipment by quieter equipment;
- (c) reducing noise emission;
- (d) isolating or enclosing noisy equipment; and
- (e) the acoustical treatment of the workplace.

1.3.3 Total daily noise exposure

The total of a person's partial noise exposures over a working day (see AS/NZS 1269.1).

SECTION 2 NOISE CONTROL PLANNING IN THE DESIGN OF NEW WORKPLACES

2.1 SCOPE OF SECTION

This Section emphasizes the necessity of incorporating noise control techniques into the design, construction and fit-out of new workplaces. This Section should be read in conjunction with Sections 3 and 4, where additional information is given that is relevant to new workplaces as well as existing ones.

2.2 PRINCIPLES

2.2.1 General

The acoustical planning of new workplaces and the design and implementation of required noise control measures shall be combined into the overall design including all relevant fields such as building design, fixed building installations and production equipment. Continual communication on acoustical matters between people responsible for each field is essential so that acoustical design and noise control can be efficiently integrated into the building of a workplace and installing the production process. It is more difficult to make major changes to the building or the production process once the building is constructed and the process is operating.

The basic stages in acoustical design and noise control are as follows:

- (a) Preliminary planning and design.
- (b) Detailed planning and design.
- (c) Implementation of measures.
- (d) Assessment and acceptance.

In many situations, the involvement of external parties such as specialists in acoustics, ergonomics and occupational health and safety is recommended. Collaboration between representatives of the organization and external parties ensures that all constraints specific to the project are taken into account when choosing the noise control measures. The success of noise control planning is directly related to the effective involvement of management.

There shall be a system for organizing and supervising the work. The committee or nominated person(s) shall have the relevant authority for the planning and implementation stages. Representatives of management, supervisors, employees and the project group should be included. An acoustical consultant should also be included.

The key responsibilities of different groups are listed in Table 2.1.

2.2.2 Preliminary planning and design stage

At the preliminary planning and design stage, all the acoustical and noise control design features should be considered, i.e. aims, the effects of production solutions, the effects of workplace layout and general procedures related to noise control planning. The organization of the work (forming a planning group and arranging the required professional input) should be decided at this stage.

Noise control objectives shall also be decided now. These will be determined by the organization's noise policy, which is generally in terms of—

- (a) an eight-hour equivalent continuous A-weighted sound pressure level ($L_{Aeq,8h}$) or A-weighted noise exposure ($E_{A,T}$); and
- (b) the peak sound pressure level (L_{peak}).

TABLE 2.1
KEY RESPONSIBILITIES OF PROJECT PERFORMERS

Performer	Contribution
(a) Organization management	Decide the organization's noise criteria and policy. Evaluate proposals from project management. Accept possible necessary divergence from criteria and policy. Allocate the required financial and staff resources. Require project management to— (i) identify origins of noise problems at an early stage; (ii) state possible solutions (preferably using noise prediction); and (iii) estimate resources needed.
(b) Project management	Consider noise issues seriously from start of project. Appoint a project manager with total responsibility for noise and vibration problems in the project. Working tasks, duties concerning performance, initiative and control are to be listed, for example— (i) an experienced and competent expert should note problem areas and questionable solutions as soon as basic material is appearing; (ii) procure experiences and data concerning noise from appropriate reference workplaces; (iii) produce a noise prediction map and adjust successively as layout solutions and construction methods are chosen; (iv) develop design goals in line with selected solutions; (v) distribute design goals and check lists for the project; (vi) appoint the people responsible for different areas in the project; and (vii) ensure that the noise issues are discussed and reviewed at the project meetings and that satisfactory solutions are chosen, in cooperation with an acoustical expert whenever this is required.
(c) Architect and builders	Incorporate noise and vibration design goals and check lists in planning of overall design and construction. Select the construction materials as necessary. Identify problems and risks during the course of the project and find solutions (requires cooperation in the project groups).
(d) Design engineers	Provide design data for machine foundations and installations to meet goals for control of noise and vibrations. Solve any problems with siting and installation of noisy equipment (in association with builders). Plan and dimension the measures for noise and vibration reduction (in association with production engineers and the acoustical expert).
(e) Production engineer	Specify the relevant noise level requirement based on the design goals (see above). Develop production layout, transportation methods and working methods which reduce noise generation. Introduce construction modifications or added measures which reduce noise levels from new equipment (in association with machine suppliers).

(continued)

TABLE 2.1 (continued)

Performer	Contribution
(f) Health and safety officer, employee representatives	Draw attention to potential risks and operational problems based on practical experiences. Propose problem solutions and look through proposals intended to control noise in workplaces.
(g) Purchaser/Procurement officer	Submit relevant noise requirements (see production engineer) to suppliers and require them to present alternative solutions based on experience in noise reduction. Insert and enforce noise level guarantees in purchase contracts (including control methods). Record reason(s) for purchasing decisions where noise requirements have been specified.

From the criterion for $L_{Aeq,8h}$ the criteria for immission levels in different parts of the workplace can be calculated by taking the predicted duration of noise exposure into account. If exposure duration is brief, the maximum permissible immission levels may be numerically higher than the exposure levels set by the organization's noise policy, provided the remainder of the person's exposure is not excessive. For example, a person could be exposed to an immission level of 88 dB(A) for up to 4 h per day without exceeding an $L_{Aeq,8h}$ of 85 dB(A), provided there was no other significant noise exposure that day. Where daily exposure duration exceeds 8 h, reference should be made to AS/NZS 1269.1.

The criterion for peak level sets the peak immission level directly, since L_{peak} is independent of exposure duration.

Generally, when designing new workplaces, the objectives should be more stringent (lower noise immission and emission levels) than those set by the organization's noise policy. Objectives regarding the acoustical quality of the room (reverberation time and spatial sound decay) can also be set (see Section 4).

An important aspect of noise control is the location of workstations in relation to noisy machines and equipment. If the production is mainly automatic, only the maintenance personnel will be exposed to possible high noise levels. In this case, low noise exposure of other people is much easier to achieve but must, however, be considered at this stage. In some situations automation or remote control of the process, the machine or the equipment may be the only feasible measure.

Production efficiency and efficient material flow may conflict with good acoustical design. Resolution of the conflict is greatly facilitated by specifying machinery with intrinsically low noise emission.

At the preliminary planning stage, the location of different types of tasks in different parts of the workplace shall be considered. Workstations should be located and constructed in such a way that airborne and structure-borne noise from noisy machines is sufficiently reduced (see Section 4).

2.2.3 Detailed planning and design stage

2.2.3.1 General

At the detailed planning and design stage, noise control design is generally a three-phase task, comprising—

- determination or estimation of noise emission values of machines;
- estimation of sound propagation parameters of the room, and of noise immission and noise exposure levels; and
- selection of noise control measures.

This stage is the most important in influencing the future result and the use of an acoustical consultant is often justified.

2.2.3.2 *Obtaining noise emission values*

A noise control plan can be made only if the noise emission of machines is known or estimated (see Clause 2.4).

2.2.3.3 *Estimation of sound propagation parameters and noise immission levels*

To estimate the sound propagation parameters of a workspace or area and the noise immission levels several methods are available. One method is to use computer-based noise prediction techniques developed for the acoustical design of workplaces (see Clause 2.3).

In addition to the prediction of noise levels in production areas, the transmission of noise from one workstation into another shall be examined (see Section 4).

2.2.3.4 *Selection of noise control measures*

Estimated noise immission levels at workstations are compared with objectives to determine where and which noise control measures are required.

Based on an evaluation of the predicted effects of noise control measures on noise levels (see Clause 2.3), production process and other aspects, the most appropriate set of noise control measures is selected. Detailed plans with necessary drawings and descriptions of the work to be done can then be made.

2.2.4 Implementation stage

The following general principles apply:

- (a) The tasks related to building of a new workplace are carried out in this phase, e.g. structural joints, vibration isolation (e.g. floating floors), structures for airborne sound insulation and absorbing lining of surfaces.
- (b) The tasks related to machine structures are carried out by the machine manufacturer in close collaboration with the buyer.
- (c) Silencers, isolators and enclosures are considered in relation to the installation of the machines and equipment (see Section 4).

2.2.5 Assessment and acceptance stage

After the completion of the new workplace, the acceptance inspection is carried out. This includes the following:

- (a) Measurement of noise immission levels (and, if necessary, of noise emission values and sound propagation parameters) in relation to the objectives.
- (b) Verification of the performance of noise control devices, if any.
- (c) Identification of possible installation faults and their repair.
- (d) Identification of possible manufacturing errors in machines and their repair.
- (e) Statement of possible additional tasks to reach the objectives.

2.3 NOISE PREDICTION AS A PLANNING TOOL

Useful noise prediction techniques are available for modelling indoor sound propagation and calculating noise immission levels, enabling the most appropriate control measures to be chosen. These techniques can be applied most usefully at the design stage of a new workroom. They are also a useful tool in the case of existing workrooms with an unsatisfactory noise situation or in the case of workrooms that have to be modified due to the starting of a new activity or work reorganization. Several possible designs of a projected workroom should be considered. Indoor noise prediction is a complex procedure and relevant expertise is required.

2.4 ACQUIRING MACHINERY

2.4.1 Questions that a potential user should consider

Before acquiring, designing or constructing a machine, a potential user should always consider the following basic questions:

- (a) Is information available about the noise emission of that family of machines and about the lowest noise emission level achievable?
- (b) Has a specific request for information or guarantee on noise emission been included in the specification and is the request properly formulated?
- (c) What will be the noise impact of the machine on the workplace?

In order to answer these questions, the potential user should consider the following:

- (i) The noise immission information available for the workplace where the machine will operate, or, if it does not yet exist for another workplace with similar industrial activity.
- (ii) The noise emission information for similar machines that may already be available within the organization.
- (iii) The noise immission criteria applicable to the workplace concerned, and, if any, the noise emission criteria for the machine.
- (iv) The long-term noise reduction program of the organization.
- (v) What noise emission information and optionally, what compliance with a noise immission requirement can reasonably be requested from potential suppliers, taking into account technical usefulness and practicability. This may imply an interaction between several parties inside and outside the organization and discussion with potential suppliers.
- (vi) What this noise emission information means, how it can be used and for what purposes.

2.4.2 Information to be requested from potential suppliers

The basic information to be requested from potential suppliers includes the following noise emission data:

- (a) A-weighted sound power level, L_{WA} .
- (b) The following noise emission sound pressure levels at defined workstations:
 - (i) A-weighted sound pressure level, L_{pA} .
 - (ii) Peak sound pressure level, L_{peak} , if relevant.
- (c) Reference to the standardized noise test code used or, if there is no such code for the machine concerned, a full description of the noise emission measurement method, the workstation position, the mounting and operating conditions and the work-cycle of the machine.

It is recommended that the noise emission sound pressure levels at workstations and the sound power levels in frequency bands (such as octave or third-octave bands) also be requested.

If a noise test code exists for the family of machines concerned, the above noise emission quantities shall comply with the requirements of this test code. Explicit reference in the noise emission declaration to the applicable standardized noise test code, if any, should be given. If the noise test code offers alternatives (regarding operating and mounting conditions, work cycles, workstation positions, noise measurement methods) or if no noise test code exists, the noise emission declaration shall yield all information necessary to make the noise declaration clear.

Additionally, and following a private agreement between the user and a potential supplier, noise emission data for work cycles, mounting and operating conditions which differ from those defined in the relevant noise test code, if any, but which correspond to conditions of operation of special interest to the user, may also be provided by the supplier.

2.5 CHECKLIST

The checklist provided in Figure 2.1 should be used to help in following the guidance on noise control planning in the design of new workplaces provided in this Section.

Item no.	Item	Clause	Yes	If no:	
				Reason	Action needed
1	Is design for noise control built in to the overall design of the new workplace/process?	2.2.1			
2	Have arrangements been made to ensure that noise control work is effectively managed?	2.2.1			
3	Have relevant workplace parties, authorities and technical advisers been consulted?	2.2.1			
4	Have noise immission and exposure criteria been set?	2.2.3.1 to 2.2.3.3			
5	Have design noise criteria and noise control objectives for workstations been set?	2.2.2			
6	Has the use of formal noise prediction techniques been considered?	2.2.3			
7	Have appropriate noise control measures been planned and specified in relevant drawings and specifications?	2.2.3.4			
8	Have the specified noise control measures been implemented?	2.2.5			
9	Has noise emission and control information been requested from potential suppliers of machinery?	2.4			
10	Has an acceptance inspection of the completed workplace been carried out?	2.5			

FIGURE 2.1 NOISE CONTROL PLANNING—THE DESIGN OF A NEW WORKPLACE

SECTION 3 NOISE CONTROL MANAGEMENT IN EXISTING WORKPLACES

3.1 SCOPE OF SECTION

This Section outlines the steps involved in the development, implementation and monitoring of a noise control program in an existing workplace. Technical aspects of noise control and basic noise control techniques are dealt with in more detail in Section 4.

3.2 PRINCIPLES

Systematic investigation, planning, budgeting and implementation are necessary to deal effectively with noise problems in existing workplaces. Controlling noise gradually is usually more feasible than trying to do everything at once. It is therefore in the interests of the organization to have an official noise control program incorporating clear objectives with a plan and timetable for achieving them.

Noise control measures are most effective if they are integrated at the design stage of machines, production processes, workstations and tasks. Machine operation, material transport, safety technology, ergonomics and environmental protection should also be considered at that stage. The need for integrated design applies as much to the modification of existing equipment as to the construction of new equipment.

From the outset all parties affected should take part in the assessment of the noise problem and the determination and implementation of noise control measures. This will maximize the efficiency of the process and meet requirements for consultation with employees on matters affecting occupational health and safety.

It may be appropriate to engage a consultant to undertake particular aspects of the noise control program, for example—

- (a) assessing and ranking of noise problems;
- (b) investigating and costing noise control options;
- (c) designing options for process or procedure modifications; and
- (d) discussing proposed solutions with operators and maintenance and engineering personnel to identify constraints and opportunities.

The consultant could also be commissioned to prepare a draft noise control plan. It would then be the responsibility of the employer to develop this draft into a final plan through the normal workplace consultative process.

3.3 BASIC NOISE CONTROL PROGRAM

3.3.1 Overview

The key steps in formulating a noise control program for existing workplaces are to—

- (a) determine the organization's noise policy and noise control objectives;
- (b) make organizational and management arrangements appropriate to the size and structure of the organization;
- (c) arrange for information and training;
- (d) assess and rank noise problems;
- (e) investigate noise control treatment options, select treatments and set priorities for applying treatments;

- (f) formulate a noise control plan and timetable;
- (g) implement the plan; and
- (h) monitor and review implementation of the plan and of the program generally.

Each step is discussed in more detail below.

3.3.2 Determine noise policy and noise control objectives

3.3.2.1 General

The organization shall develop a noise policy stating major noise control objectives and the means proposed for achieving them. A firm policy will put noise clearly on the agenda of management, provide a foundation for planning, budgeting and progress review, minimize wastage on piecemeal and ill-considered solutions and provide evidence of compliance with regulatory requirements.

Objectives should be based on general knowledge of the effects of noise on people's health and well-being and on local legal requirements. Management should arrange to be briefed about—

- (a) the effects of noise (hearing loss, tinnitus, annoyance, poor communications, personal and social consequences and possible effects on health, safety and productivity);
- (b) legal obligations regarding management of noise hazards and risks; and
- (c) required or recommended approaches to noise control management as set out in relevant regulations, codes of practice or other guidance material.

Regulations or their associated codes of practice typically specify a preferred sequence of risk control measures in the order of engineering controls, administrative controls and personal hearing protection. Regulations or codes of practice usually also specify minimum requirements regarding information and training for selection, fitting and maintenance of personal hearing protectors and in some cases, monitoring of hearing.

The organization's noise policy should aim to meet or exceed the requirements of relevant occupational noise regulations. Where a higher standard of protection and better communication and working conditions are considered appropriate, the policy should set more stringent requirements, as regulations generally express minimum rather than ideal objectives.

The organization's noise policy should be circulated so everyone concerned has a record of the objectives and rules. It should also be used for training purposes and should be accessible to all employees.

3.3.2.2 General objectives

Major objectives regarding workplace noise conditions are usually expressed in terms of noise immission or noise exposure levels (see Clause 2.2.2).

Reference shall be made to local occupational noise regulations to ascertain the noise criteria presently in force. It may also be advisable to check with the relevant statutory authority to identify whether any lowering of the criteria is planned.

The general rules for keeping noise under control in existing workplaces are to—

- (a) critically review existing processes to see if low-noise alternatives may be substituted;
- (b) favour low-noise items whenever new or replacement machinery is purchased;
- (c) apply noise control treatments to existing equipment;
- (d) take noise into account when reconditioning or modifying equipment;
- (e) maintain low noise levels by systematic maintenance of control measures; and

- (f) follow quiet work practices.

The organization's noise policy should take all these factors into account.

3.3.2.3 *Specific objectives*

As soon as the organization has decided on its general noise control objectives the following specific objectives should be considered:

- (a) *Low-noise alternatives* All noisy processes and areas should be systematically examined for the possibility of substituting an intrinsically quieter process or of carrying out the existing process in a quieter way.
- (b) *Buy quiet* The organization should require the lowest practical noise emission levels whenever equipment is purchased or replaced. This minimizes the need for adding noise controls later and allows for progressive replacement of existing noisy equipment with quieter equipment at a rate that is practical for the organization. Machinery manufacturers are subject to regulatory requirements to minimize noise emission and an increasing number produce low-noise versions of previously noisy items.
- (c) *Apply noise controls to existing equipment* Noisy equipment should be assessed with a view to progressively reducing noise immission at workstations. The noise policy should state a continuing commitment to this process and to the provision of necessary resources at a rate that is practicable in view of current technology and the organization's level of resources.
- (d) *Take noise into account when reconditioning or modifying equipment* It is sometimes necessary to overhaul equipment or modify it in some way for production purposes. These occasions provide opportunities for cost-effective noise control, as the design and installation of the necessary acoustical or vibration controls can often be efficiently integrated with the overall reconditioning or modification.
- (e) *Maintain low noise levels* The noise policy should state that maintenance objectives include noise reduction as well as maintaining operational efficiency. Maintenance personnel should be instructed to give specific attention to noise sources and noise control devices during routine workplace inspection and maintenance activities. Regular checks should be made of—
 - (i) machines (e.g. motors and pumps) and machine elements (e.g. fans, gear boxes and bearings);
 - (ii) vibration isolators and impact absorbers;
 - (iii) noise control attachments such as exhaust silencers and acoustical lagging;
 - (iv) acoustical enclosures and panels and their component seals, access ports and hinges;
 - (v) noise barriers and screens; and
 - (vi) acoustical treatment of the workplace.
- (f) *Follow quiet work practices* Some noise control measures are the responsibility of the employee and therefore the noise control policy should encourage employees to follow quiet work practices (see Clause 4.7). The success of such measures depends on people's awareness of the effects of excessive noise and their knowledge of ways of working quietly. These in turn depend on adequate information and training about ways to reduce noise.

NOTE: Details on the technical aspects of quiet working practices are given in Appendix A.

3.3.3 Make appropriate organizational arrangements

3.3.3.1 General

An effective noise management program requires coordinated action from several groups in the organization. Responsibilities for implementing aspects of the noise program shall be documented in the duty statements of relevant positions. Table 3.1 lists the responsibilities of key groups within a large organization. In small organizations the responsibility may devolve to one person. Groups should work in consultation and there should be efficient lines of communication between them. Overall coordination should be provided by senior management or a delegated person or steering committee. While senior management has final responsibility, it should make decisions only after full consultation with other groups and ideally in conjunction with them.

3.3.3.2 Procedural arrangements to implement a 'buy-quiet' policy

Specific procedural arrangements should be made to ensure that—

- (a) personnel preparing purchase requests or tenders for potentially noisy equipment specify maximum acceptable noise emission values;
- (b) those who approve the release of final purchase requests or invitations to tender verify that noise aspects have been properly considered and specified;
- (c) noise is properly taken into account in the final selection of the item to be purchased;
- (d) upon delivery, the equipment is assessed to determine that the noise specifications are met or that a certificate of compliance has been issued by the supplier; and
- (e) before approving final payment the purchasing department has verified that noise related contractual requirements have been met.

3.3.3.3 Fault reporting and maintenance system

A system should be put in place to document faults that cause noise problems, require their repair and record the action taken. An example is the tag system shown in Figure 3.1 used for reporting noise problems. Details of the problem are recorded on the right half-tag, which is detached and forwarded to maintenance personnel. The stub of the tag is attached to the faulty equipment and remains there until the problem is fixed, at which time the repairer records details of the repair on the stub and forwards it to maintenance so that it can be matched with the other half to record completion of the repair.

3.3.4 Arrange information and training

The success of a noise control program depends on personnel being responsive to the need for noise reduction, avoidance of excessive exposure and personal hearing protection. All personnel shall be made aware of the problems associated with noise. More specific training and information should be directed to managers and purchasing personnel. Technical training in basic noise control measures for engineering, maintenance and technical personnel may be necessary.

Information shall be provided to employees, taking language and literacy into account, to familiarize them with—

- (a) what noise is;
- (b) the range of health effects due to noise;
- (c) the social handicaps of noise-induced hearing loss and tinnitus;
- (d) the exposures to noise in their particular workplace;
- (e) the reasons for, and nature of, the general noise control measures which are used to protect them and other people who might be affected by their work;