

Hearing Protection

320. Personal protective equipment should always be considered the last resort as a noise control measure. All other control measures should be considered first, and if a noise hazard still remains *then* it is time to look at hearing protection.

321. There is a full description of the choice and use of hearing protection in Chapter 7. This should be read before selecting and supplying staff with earplugs or other types of hearing protection.

322. EXAMPLE NOTICE

The sound levels on this stage can be dangerously loud, and you may have to work on or near it for many hours.

Please take a couple of minutes to read this notice – it could help you for the rest of your life.

Work on this stage could cause permanent hearing damage. Eventually you may be unable to continue working in the live music business. The Control of Noise at Work Regulations set a maximum daily dose of 85 dB over 8 hours. The table below shows how quickly you can get an equivalent dose in a loud stage environment.

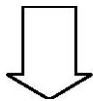
Average noise level	Time taken to receive a damaging dose
85 decibels	8 hours
97 decibels	½ hour
106 decibels	3¼ minutes

Hearing damage is permanent and irreversible causes deafness and can lead to other illness may cause tinnitus -- a ringing generated inside the ear causes stress, pain and irritation

TAKE THESE SIMPLE STEPS TO PROTECT YOUR HEARING

- . • If you do not need to be near or on the stage get away from the stage when possible
- . • Turn it down whenever you can – keep stage levels to a minimum
- . • Carry a personal set of earplugs. They cost a few quid and give excellent protection.

323.



MUSICAL ACT FOR MY CLUB

I HAVE BOOKED A

Is Has the Refer to previous risk noise level YES act played

Confirm the likely to be at the expected music levels a risk? venue? are the same or lower than previous NO performances NO YES assessment.

Identify main sources of risk, such as bands playing loud music, DJs playing loud music through PA system, karaoke

Identify persons at risk such as bar, waiting and kitchen staff, performers, DJs, technical and security staff

Implement control measures and hearing protection if required See text Implement previous control measures and hearing protection if required

Record your risk assessment

Monitor noise & control measures during performance

Review noise risk assessment regularly & after significant changes

FLOW CHART FOR A RISK ASSESSMENT OF A CLUB PERFORMANCE

324. This section provides advice on methods of controlling the risk of hearing loss in venues where amplified music is played, including nightclubs, bars, pubs and restaurants. In most industries noise is an unwanted by-product. However, high sound levels often provide the principal stimulus for customers to attend a pub or club. It is important to remember that all employees, including any guest performers, are covered by the Noise Regulations and employers have responsibilities to protect their employees' hearing. Self-employed people should also read Chapter 4: Freelancers.

325. There is a strong likelihood that workers in venues playing amplified music will be

exposed to noise levels greater than the Upper Exposure Action Value of the Noise Regulations. For representative levels of exposure see Appendix 2. At these levels of exposure the employer is required to:

- . • Assess the risks to employees from the noise (see Chapter 5)
- . • Take action to reduce the noise exposure that produces the risk (see Chapter 6)
- . • Provide hearing protection and ensure it is worn (see Chapter 7)
- . • Provide information instruction and training (see Chapter 8)
- . • Carry out health surveillance (see Chapter 9)

326. This section provides guidance on the many ways noise exposure can be reduced. No single measure will be appropriate for every situation and it is important to identify the actions that will best control the risk.

DESIGN

327. Methods of reducing noise in work areas can be split into two categories: physical separation and focusing the music in the desired locations. Architects/designers and owners/operators proposing new buildings or refurbishments should consult competent acousticians and/or sound engineers before undertaking any major work. See also Section 1: Venues.

INSERT DRAWING Two components of noise 328. The noise in a venue is made up of two components: the direct path is the uninterrupted path between the loudspeaker and the ear, and the reverberant path is the sound reflected off one or more surfaces. To be effective most noise control methods need to have acoustic absorption to control the reverberant paths. Note that absorption can also improve the quality of the reproduction of the music. Uncovered floors and plastered ceilings and walls should be avoided where practicable. Suitable absorption may be achieved by:

- . • Lining the ceiling above the dance floor and performance areas with acoustically absorbent materials, such as acoustic tiles
- . • Lining walls with acoustic absorbent coatings (durable coatings are available for the lower parts of walls)
- . • Lining static work areas, such as pay desks or cloakrooms, with absorbent coatings

• Providing curtaining and carpeting 329. It is important that the materials used meet the required standards of flame retardancy and flame propagation.

Physical separation

330. The following techniques help separate staff from the music:

- . • Position bars away from the dance floor and performance areas
- . • Provide staff off-duty areas with noise levels below 80 dB
- . • Locate bars in quiet areas or “chill-out” rooms where the noise levels are preferably below 80 dB
- . • Place acoustic screening to protect specific work locations from direct noise sources. The effectiveness of screens depends on their design and location(s) which need to be carefully considered

Sound equipment

331. Successful noise control requires the music to be focused where it is required (such as the dance floor or the performance area.) The following techniques can help to focus the music and therefore reduce the noise levels off the dance floor or performance area:

- . • The use of equipment, which avoids distortion, allows volume levels to be set lower whilst achieving the desired effect
- . • Distribute the sound evenly using directional loudspeakers, for example over the dance floor using loudspeakers mounted in the ceiling and facing downwards
- . • Increase the number of directional loudspeakers to avoid “hot-spots”
- . • Install vibration isolation mounts to loudspeakers to prevent noise entering the building structure
- . • Avoid peripheral loudspeakers or reduce their volume if they cannot be avoided
- . • Do not have loudspeakers pointing toward the bar or other fixed work locations

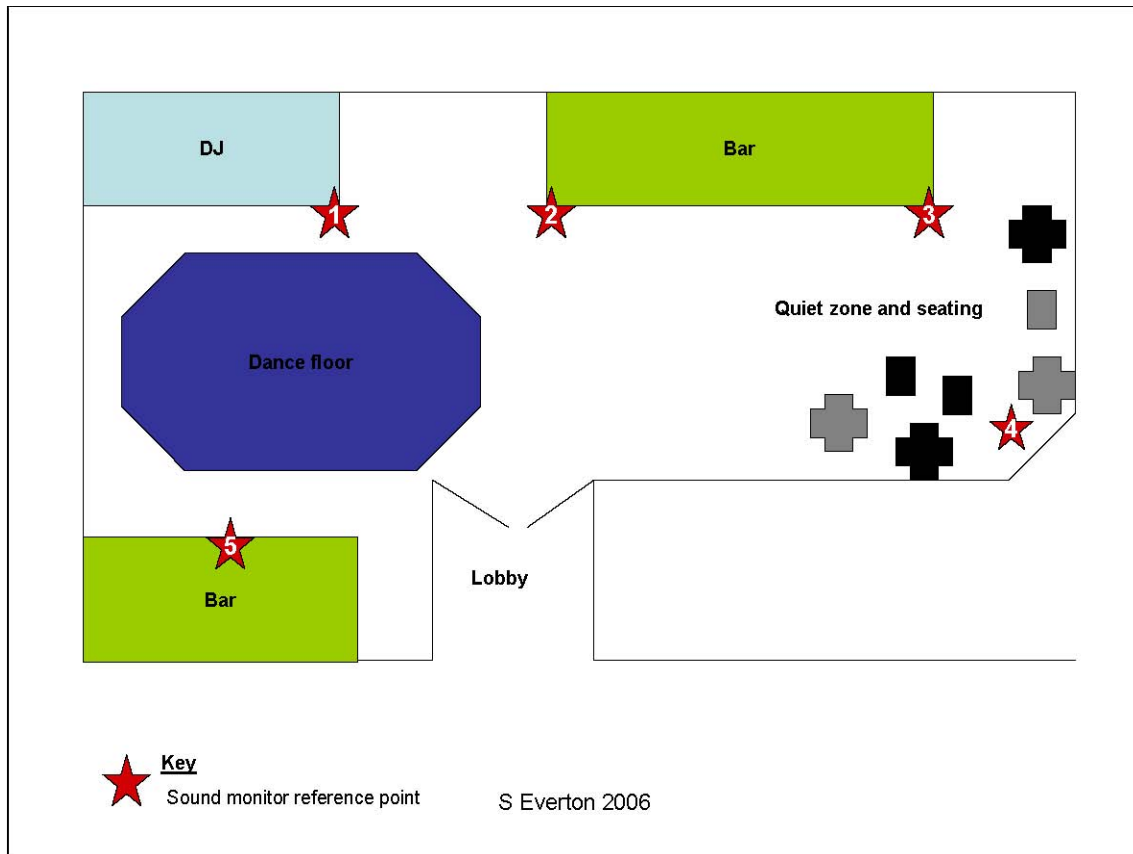
MANAGEMENT

332. Venue operators are encouraged to develop a written statement of policy. This document should aim to provide clear messages regarding the control of noise in the venue to all staff and subcontractors (see also Section 1: Venues.) It should also include policies on the following:

Level setting and monitoring

333. The volume level of the music is critical to the protection of employee’s hearing. The volume in each venue is dependent on factors such as the type of venue, the effectiveness of the venue design and the type of music, which is likely to vary during each event. The venue’s policy should clearly state the criteria used to determine noise levels. The policy should be communicated to all people who have the potential to influence the noise generated (for example duty managers, DJs, musicians and technicians.) Karaoke systems should have in-built noise limiters. Control and monitoring can be achieved using the following techniques:

- Noise limiters that are designed to prevent the volume of music from exceeding a predetermined level. One type controls the volume in discrete steps and is therefore virtually undetectable. The other type switches off the power to the music system if a specific volume is exceeded; this is not recommended because of the abrupt cut off.
Noise limiters should be tamper proof or located in secure areas.
- . • Spot checks of the noise level using a sound level meter at a predetermined reference position(s). See Chapter 5 and diagram below.



334. Example of pub/club layout showing reference positions for noise measurement

Exposure management

335. Limiting the time staff spend in the noise will reduce their noise exposure.

336. Rotating staff between noisy and quiet areas will reduce their exposure as will rotation of staff between quiet and noisy shifts. Task rotation can provide some reduction in exposure where there are workstations situated in quiet areas. Management should have sufficient control and administration to demonstrate how the system safeguards staff. The management should explain the purpose of any rotation system to staff.

337. Regular 'quiet breaks' and periods working in quiet areas should be provided.

338. The Noise Regulations allow the noise exposure to be assessed over a week rather than a day in certain circumstances (see Chapter 5[Ref].)

Maintenance

339. Sound equipment does deteriorate and should be properly checked and maintained. Note in particular there is a tendency to increase the volume if the music system is distorting.

340. Equipment such as noise limiters, acoustic screens, sound absorbers and vibration isolation mounts should also be kept in good working order.

Information, instruction and training

341. Employees need to understand the risk of hearing loss and how it is being controlled, including the proper use of hearing protection. Consult Chapter 8. Individuals who have influence over the noise levels (duty managers, DJs, musicians and technicians) need to understand their responsibilities.

Hearing protection

342. Consult Chapter 7.

343. EXAMPLE – DJ HARMED

A 24 year old DJ related that one night, after working in a club where the sound system was particularly loud, he went home with a ringing sensation that was so bad it took several days for his ears to recover. The ringing in one ear (tinnitus) has never completely stopped. He has become very sensitive to loud music, particularly high frequencies, and his tinnitus increases dramatically if exposed to loud noise. He is now careful always to wear earplugs when DJing.

Health Surveillance

344. Consult Chapter 9.

345. Case Study

Refurbishment of two clubs located in one building provided an opportunity to re-design the nightclubs with the aim of reducing the employees' exposure to noise. Before the refurbishment the clubs had very little acoustic absorption in them and the lack of space made it difficult to introduce a quiet zone.

The following design changes were introduced as part of the refurbishment;

- A bar was moved to increase the distance between it and the dance floor
- All loudspeakers were oriented so they faced away from the bars
- Acoustic absorbent tiles were placed on the ceiling
- Acoustic absorbent material was placed on as much wall area of the club as possible (durable coatings near the floor, spray coatings nearer the ceilings)
- Areas were finished with mineral wool absorbers behind galvanized perforated sheet steel
- A large toughened glass screen was positioned one end of a bar to shield it from the dance floor
- Vibration isolation was used to isolate the bass bins (loudspeakers)
- Narrow directivity loudspeakers were mounted in the ceiling above the dance floor and positioned pointing down
- DJ console was created which also acted as a screen for a bar behind
- The sound system was used to carefully equalise the music and set at a level of 103 dB on the dance floor.

The Table shows the measured daily noise exposure before and after the refurbishment.

Job	Before refurbishment $L_{EP,d}$ dB	After refurbishment $L_{EP,d}$ dB
Bar Staff	90.3 - 95.9	86.6 - 89.1
Glass collectors	95.2 - 98.1	94.5 - 97.0
DJ	98.6 - 99.8	97.3 - 98.2

Commentary

Significant reduction in the exposures of bar staff was achieved; however hearing protection was still required. Glass collectors were required to wear hearing protection and DJs were encouraged to avoid using monitor loudspeakers and to use earmuffs with sound restoration or in-ear monitors - see Chapter 7.