

# **DONCASTER MUSIC SUPPORT SERVICE**

Survey of Noise Levels  
in daily teaching situations

**December 2001**

## Background

This survey was carried out in **November 2001**, in response to current concerns that some staff in instrumental teaching situations may be experiencing levels of sound which exceed the permitted levels.

The survey was exploratory rather than definitive, in that only a sample of staff who were likely to be affected were tested. However, the results can fairly be extrapolated to take into account staff who work in similar situations.

## Sound levels where action needs to be taken

The level of sound to which a person can be exposed is based on two factors - noise level and noise duration. Combined they make up a noise dose, and two action levels have been agreed which are based on the average noise level over an eight hour working day. Where the exposure lasts for a shorter period the average noise level can be higher.

Action Level	dose over 8 hours	Action to be taken by employers
1	85dB(A)	<ul style="list-style-type: none"><li>i) Provide adequate information, instruction and training about risks to hearing.(Reg 11)</li><li>ii) As far as is practicable ensure that ear protectors are provided for all staff who ask for them. (Reg 8(1)).</li><li>iii) maintain and repair these. (Reg 10)</li><li>iv) Keep a record of the noise assessments until a new one is taken. (Reg 5)</li></ul>
2	90dB(A)	<ul style="list-style-type: none"><li>i) iii) and iv) from above</li><li>v) Reduce exposure to noise as far as reasonably practicable by means other than ear protection. (Reg 7)</li><li>vi) As far as is practicable ensure that ear protectors are provided to all exposed. Reg (8(2))</li><li>vii) Make sure the ear protectors are worn by all exposed.</li></ul>

In addition to these two action levels, the law also states that where a person is exposed to a sound louder

than 140dB - no matter how short the noise is - the exposure must be kept below 140dB, and all actions required in action level 2 apply.

## **How the testing was done.**

An approach was made to the Association of Noise Consultants to ask for advice on the most effective way for our Service to carry out a noise level survey. As a result, two companies - Hepworth Acoustics (Sheffield) and Vibrock Limited (Heanor, Derbyshire) were asked to provide advice and quotations based on our instructions.

Two dose badges (made by Cirrus) were subsequently hired from Vibrock Limited. These record the average dose of sound to which the wearer has been exposed. These were worn in turn by several members of staff during the course of a typical teaching day. The levels recorded during each day were read into a badge reader, and a printout of readings taken was supplied by Vibrock at the end of the hire period.

The testing was planned, overseen and readings taken by a member of the Senior Management who has taken the time to become fully briefed on the **Noise at Work Regulations** and taken advice on the use of dose badges, interpreting readings, and calculating the  $LEP,d$  (daily personal exposure) from these readings. Regulation 4 says that the testing must be done by a competent person. Advice from the Health and Safety Executive says that this should be ...

*"someone who understands HSE's guidance on assessment and how to apply it in your workplace. The essential qualification for the person is the ability to do the job properly and to know his or her own limits; this is more important than formal qualifications."*

Brass, wind, percussion, recorder and electric guitar lessons and ensembles were tested. In addition, two wind band rehearsals were tested. One over a two hour period, and one over a four hour period.

The actual length of time of each test is not critical - a longer test period might produce a more accurate average reading where the levels of a person's sound exposure varies greatly during the day ie. sometimes they have "quiet" periods. **For the purpose of this survey, it is fair to assume that a teacher is doing similar work throughout the rest of the teaching day.**

## The Readings

The printout of dose badge readings shows a variety of information. What is of greatest interest for the purposes of this survey is the Leq, the Peak and the O.L. readings.

### Leq

An average noise level reading over the period of the test, "A" weighted and expressed in decibels (dBA). Because dB readings are logarithmic, a doubling of the noise level results in a 3dB increase in the Leq.

### Peak

When exceeded, this indicates that the noise level has exceeded 140dB Peak at some time during the testing period. There is no way of knowing how many times this has happened.

### O.L.

When exceeded, this indicates that the noise level has exceeded the upper design limit of the recording instrument.

The  $LEP_d$  reading gives a measurement of daily personal dose expressed in dB(A). It assumes two things:

- 1) That the working day is 8 hours long.
- 2) That the level recorded as the Leq will only apply for the duration of the testing period, and that for the remainder of the 8 hour period, the person being tested will be subjected only to a sound level below 85dB(A).

This reading is of limited use for the purposes of this survey.

For each reading taken, it is possible to find where the teacher has exceeded an action level by producing an  $LEP_d$  level based on the Leq and the length of a working day, or specific exposure time in the case of ensembles. The calculation to do this is shown in Appendix A. **For the purposes of this survey, the length of a normal teaching day has been taken as 6 hours.** This means that a teacher can be exposed to higher levels of noise than would be allowed in an 8 hour day. It does not of course take into account any playing of instruments or exposure which a teacher might experience outside of their normal working day (eg. practising or playing in an evening event).

## The Results

The following table gives the results of the teachers tested during a typical teaching day. The  $LEP_d$  (daily personal dose) is calculated on a 6 hour working day in the case of the first 6 results, and on the length of the ensemble for the remaining 5. (P) indicates the peak level (140dB) has been exceeded.

Teacher	Instrument	Test length <i>Hrs:Min</i>	Leq <i>dB(A)</i>	$LEP_d$ *	Action Level exceeded
*****	Brass	4:10	88.8	87.5	1st
*****	Woodwind	4:16	87.2	85.95	1st
*****	Woodwind	4:22	82.7	81.45	(P)
*****	Brass	4:16	90.9	89.65	1st
*****	Percussion	2:31	94.9	93.65	2nd (P)
*****	Woodwind	3:58	88.1	86.85	1st

Some Music Centre ensembles, which of course run for less than a full teaching day, were also tested. For the  $LEP_d$  level to be meaningful here, the teacher tested would have to be subjected only to quiet levels of noise (below about 75dB(A)) for the remainder of the day. In most cases (marked \$) this is not the case; the teacher is also teaching in schools for some of the day. The daily dose of noise will then of course be higher.

Teacher	Group	Group length	Test length <i>Hrs:Min</i>	Leq <i>dB(A)</i>	$LEP_d$ *	Action Level exceeded
*****\$	Recorder	2:30	1:30	87.4	82.34	
*****\$	Electric guitar	2:30	1:54	97.2	92.14	2nd
*****\$	Concert Band	2:00	1:47	94	87.97	1st
*****	Junior bands	3:45	3:50	93.5	90.20	2nd
*****	Percussion	3:15	2:48	92.1	88.18	1st (P)

Because of a problem with the testing equipment, it was not possible to calibrate the dose badges before making the last three readings. Vibrock have said that these three results should therefore be indicative rather than definitive.

The peak level (140 dB) was exceeded in three of the tests. It is possible for a peak reading to be the result of an accidental tap of the dose badge, and this is probably the cause of the peak level read by a wind teacher. The two peak readings in percussion lessons and ensemble are almost certainly correct.

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\* calculations to produce  $LEP_d$  over a 6 hour working day are shown in Appendix A

## Conclusion and recommendations

Most staff tested exceeded noise levels above the 1st action level. It is fair to assume that all brass, woodwind and percussion teachers are working in environments which, on some days at least, will exceed the 1st action level.

It is therefore a requirement of the Noise at Work Regulations that these staff are **provided with adequate information, instruction and training about risks of damage to hearing. Ear protection should be made available to these staff if they ask for it.**

Some staff exceeded the 2nd action level and/or the peak level.

It is therefore a requirement of the Noise at Work Regulations that these staff are **provided with adequate information, instruction and training about risks of damage to hearing** and, as far as is practicable, they should also **have their exposure to these noise levels reduced by means other than ear protection.** This could mean -

- 1) Reducing the length of time of exposure (Electric guitar group would need to be reduced to 1 hr 30 mins - Saturday band exposure to 3 hr 30 mins - Appendix A)
- 2) Finding a better teaching environment
- 3) Not playing along with pupils (own sound adds most to the daily dose)

In addition, **ear protection should be made available to these staff and DMSS has a responsibility to make sure it is worn by all exposed.**

**Ear protectors should be maintained and repaired by DMSS.**

**These noise level readings should be kept until such a time as they are replaced by other new ones.**

Kevin Edwards

*(Acting Deputy Head of Service)*

3 December 2001

## Appendix A - Calculations

The formula used to calculate the  $L_{EP,d}$  over a 6 hour working day is -

$$L_{EP,d} = 10 \times \text{LOG} (T \text{ divided by } 8) + L$$

where T is the length of the working day (or exposure time in the case of ensembles) in hours, and L is the average level of noise over the tested period (or  $L_{eq}$ ).

The formula used to calculate the length of time a person can be exposed to a particular noise level and stay below the 90dB(A) level is -

$$T = 8 \times 10^{((90 - L) \text{ divided by } 10)}$$

where T is the time allowed ( the result) and L is the average level of noise over the tested period ( $L_{eq}$ ).