

LIFE-TIME LEISURE NOISE EXPOSURE – IS IT TIME TO LOOK AT THE BIGGER PICTURE?

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This *Acoustic Opinion* proposes a re-consideration of leisure noise exposure, not on a comparative basis from the standard hazard exposure perspective, but rather from a whole-of-life perspective.

1. INTRODUCTION

For the purposes of this discussion it can be accepted as a given that exposure to noise or sound, from what ever source, is a hazard to hearing health [1, 2]. For many years, the concentration of noise exposure activities has been directed primarily toward the workplace, most obviously by reason of the existence of occupational health and safety responsibilities through the consideration of the health and safety of workers exposed to noise. These OHS obligations fall mainly on those responsible for the workplace but employees also share a significant part of this responsibility.

Leisure noise, that noise that an individual mostly chooses to experience from activities that are not commonly part of their workplace, is not specifically regulated and is hence difficult for the individual to control. To date, noise exposure outside the workplace has been discussed mainly on a comparative basis looking at the relative effects of workplace noise sources in relation to hobby or home activities such as power tool use or shooting. Possibly more importantly leisure noise should be better considered both separately and in conjunction with workplace noise as a whole-of-life exposure in a similar manner as is now done with UV-radiation (sunlight).

2. A PARTICULAR EXAMPLE

Consider now a typical example of leisure noise exposure for a young, working adult. The scenario may run as follows with the associated average noise levels (L_{Aeq}): listening to their MP3 player while commuting to and from work for a total of two hours at 91 dB; five hours on a Friday or Saturday evening spent at the pub with friends listening to a rock band where the average levels sit in the order of 100 dB; and once a month a three hour concert where the level is 106 dB.

To conveniently analyse the total noise exposure for a one month period the most practical method is to use the workplace exposure criterion where an acceptable $L_{Aeq,8h}$ is recommended to be 85 dB with a 3 dB exchange rate.

For convenience let us call this daily exposure value the ‘allowable daily exposure’ (ade). Thus an L_{Aeq} of 85 dB for eight hours is one ade; 88 dB for four hours is one ade; and 91 for five hours is 2.5 ade. Now summarise this young adults noise exposure over a one month period:

Noise source	L_{Aeq} (dB)	Time (hr)	Equivalent (ade)	Days per month	Monthly exposure (ade)
MP3 player	91	2	1	10	10
Evening at Pub	100	5	20	4	80
Rock concert	106	3	48	1	48
Cumulative exposure					138

Over the period of one year the implication is that the cumulative exposure is 1656 ade (138 x 12) and for a ten year period in the order of 16,560 ade.

Now consider the premises on which the noise exposure standards are based [3]. These are based on the acceptability of a risk of hearing loss to a small percentage of the population after exposure to an equivalent, A – weighted, continuous noise level (L_{Aeq}) of 85 dB for eight hours per day ($L_{Aeq,8h}$) for a working life of eight hours per day, five days per week. This assumes that the other sixteen hours per day and further two days per week are spent in comparative quiet, usually less than around 75 dB(A). The usual number of days considered to be working days per year is taken to be around 220 after considering recreation and sick leave and a working life can be considered to be around 40 years. Hence a working lifetime could be considered to be 8,800 days. This sets the acceptable working life exposure to workplace noise at 8,800 ade.

Now compare the acceptable working life noise exposure to the leisure noise exposure presented above. Our leisured individual over a ten year period has sustained an exposure level currently considered to be equivalent to almost two acceptable working life exposures (16560: 8800 or 1.9: 1).

4. DISCUSSION

Given the above comparison of noise exposure levels and the fact that the current recommended exposure standards do not represent a level of zero risk but rather a level of acceptable risk – much like driving on suburban streets with a speed limit of 50 k.p.h. – should we be more serious about the acknowledgement of leisure noise and its affects on society and the individual?

Appendix G from AS/NZS 1269.4 [4] presents a summary of the relative prevalence of expected hearing loss across the community from long term exposure to noise distilled from the more detailed ISO 1999 [3]. Estimating the degree of hearing loss from noise exposure is at best a very difficult process through a multiplicity of considerations and uncertainties in major part due to human factors and variations. Ethical considerations do not offer the opportunity to carry out direct exposure risk experiments on people. However, we are aware these risks exist and that avoidance and exposure minimisation are the best defence.

Exposure to loud noise during leisure is no longer limited to traditional unpleasant or unwanted noise sources such as shooting, power tools and trail bikes. Now, damaging noise can more frequently arise from wanted sound sources such as MP3

players, portable high-powered entertainment amplifiers and modern car stereo systems. Rapidly developing technology has facilitated this evolution and it certainly does not look like slowing down in the near future.

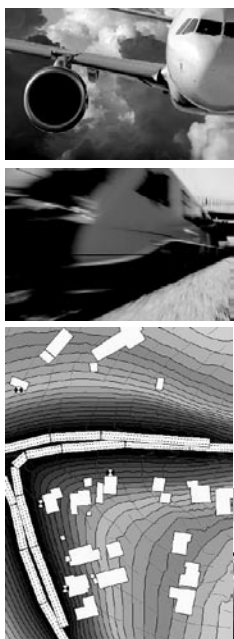
Consequently in a future society where individual and community health is of supreme importance perhaps we will firstly need to provide more consideration to the maintenance of hearing health and secondly develop noise exposure standards that can allow for a reasonable exposure to leisure noise.

REFERENCES

- [1] Sataloff, RT & Sataloff, J (1987) *Occupational Hearing Loss*, Marcel Dekker, New York
- [2] WHO (2001) *Occupational Exposure to Noise: Evaluation, Prevention and Control*, edited by B Goelzer, CH Hansen and GA Sehrndt, published by the Federal Institute for Occupational safety and Health, Dortmund, Germany for the World Health Organization, Geneva
- [3] ISO 1999 *Acoustics – Determination of occupational noise exposure and estimation of noise-induced hearing impairment*, International Organisation for Standardisation, Geneva
- [4] Australian/New Zealand Standard AS/NZS 1269.4: 2005 Occupational noise management, Part 4: Auditory assessment, Standards Australia, Sydney, 2005

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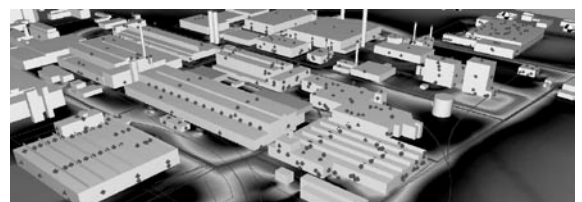


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