

COMPARISON OF NOISE EXPOSURE LEVELS BETWEEN WORKPLACES

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Project Summary

1.0 Introduction

As an essential part of any hearing conservation program, noise exposure levels of workers are measured to assess their risk of hearing loss. Whenever the legal limit is exceeded (e.g., 85 dBA, 90 dBA, etc.), measures have to be done to eliminate or reduce the risk. To do so, work practices are re-examined, hearing protection is introduced and/or engineering controls are put in place to reduce noise levels, and consequently, noise exposure levels.

Any of the above measures requires use of resources, that are usually at a high demand and short supply.

This paper presents a process by which several indices are calculated using:

- (a) the average noise exposures of the different work groups (L_{Trade}) (e.g., 85-90 dBA, 90-95 dBA, etc.).

The indices calculated using this method can be used in isolation or combined, so that a more complete picture (more representative rating) be obtained.

2.0 The Process

2.1 Ranges of Noise Exposures

The first step in the process is to choose ranges of noise exposures the data will divide. The first range usually has the lower limit of 85 dBA, since lower noise exposure levels do not present risk of hearing loss. Because in most cases 90 dBA is the limit when engineering noise control are recommended, the first range can be 85-90 dBA. The next can be 90-95 dBA, etc.

2.2 Collective Noise Exposure

The term "collective noise exposure" is defined as the sum of the products of the number of workers in each trade times their L_{Trade} . In other words, if there are two trades of 20 and 25 workers each and their L_{Trade} are 85 and 90 dBA respectively, the collective noise exposure for that workplace will be:

$$(20 \times 85) + (25 \times 90) = 3950 \text{ person} \times \text{dBA}$$

2.3 Average Noise Exposure Level

The average noise exposure level (ANEL) for each noise exposure range is calculated by dividing the sum of the collective noise exposures within each range by the number of workers within the same range. The ANEL represents roughly the average noise exposure of a worker within the noise exposure range.

2.4 Normalized Average Noise Exposure Level

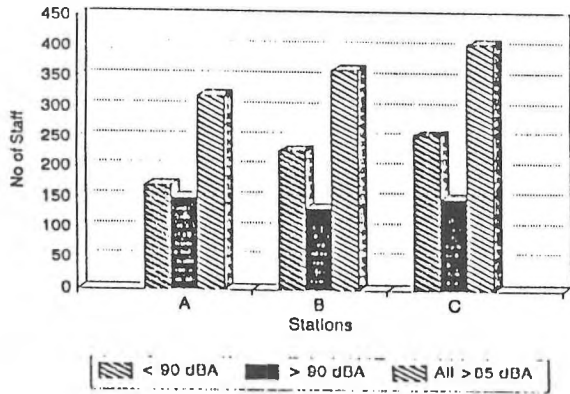
The normalized average noise exposure level is obtained by subtracting 85 dBA from the average noise exposure level. This is done to enhance differences between noise exposure levels from the different workplaces: it is easier to "see" a difference between 2 and 5 dB, than between 87 (85+2) and 90 (85+5) dB.

By subtracting 85 dBA (accepted as a "safe" limit), the normalized level can also be used as an estimate for the risk of hearing loss.

2.5 Maximum Collective L_{Trade}

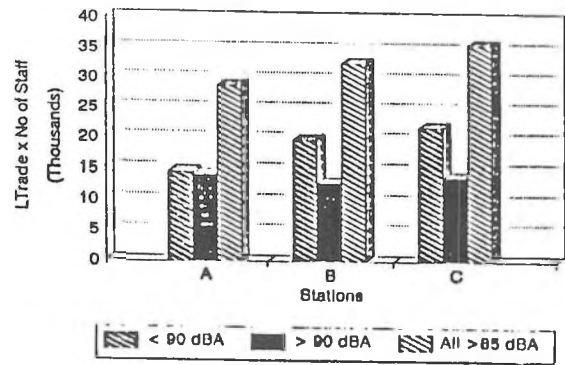
Another estimate that can be used for inter-workplaces comparison is the maximum collective L_{Trade} . This is the collective noise exposure for the trade with the highest L_{Trade} within each noise exposure range.

NUMBER OF NOISE EXPOSED STAFF



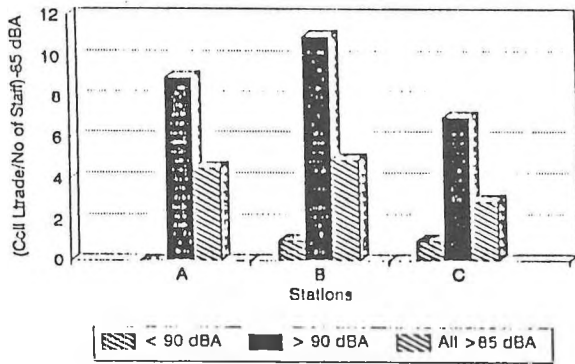
COLLECTIVE NOISE EXPOSURE

LTrade x No of Staff



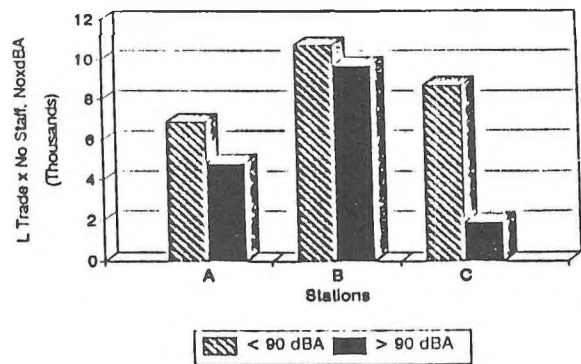
NORMALIZED NOISE EXPOSURES

(Coll LTrade/No of Staff) / - 85 dBA



MAXIMUM COLLECTIVE L Trade

LTrade x No of Staff



Example of the Indices calculated on staff from three work stations