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HUMPHREY & STRETTON, HODDESDON

NOISE AT WORK ASSESSMENT

Report 9650.NAW.01

Prepared on 7 January 2013

For:

Humphrey & Stretton PLL

Stretton House

Pindar Road

Hoddesdon

EN11 0EU

Contents

List of Attachments

1.0 INTRODUCTION

KP Acoustics has been commissioned by Humphrey and Stretton PLL, to undertake a Noise at Work Assessment in order to evaluate noise exposure levels experienced by personnel at the company's main factory at Stretton House, Pindar Rod, Hoddesdon, EN11 0EU.

This report presents the results of the noise survey, an analysis of noise exposure levels and identifies any necessary requirements for hearing protection.

2.0 NOISE SURVEY

2.1 Site Description

Humprhrey and Stretton runs a manufacturing facility for a number of door systems (acoustic, fire, security doorsets) as well as other specialist joinery products.

The factory is split between two warehouses, where staff can be exposed to a number of different noise generating apparatuses and processes during the course of a working day.

2.2 Procedure

The survey was undertaken on site on 4 January 2013 between 11:30 and 13:00 and followed the general guidelines of the EC Directive on Noise at Work 2003 and the current Noise at Work Regulations 2005.

During the course of the survey, it was ensured that staff followed normal operations and working hours wherever possible, such that typical exposure levels could be assessed.

Noise measurements were undertaken at a distance from the machinery equal to where the operator of every unit usually works. This distance varied from about 1m to 1.5m, depending on the type of machinery and mode of operation. Measurement durations varied from 30 seconds to 3 minutes and were chosen to reflect a typical cycle period of each piece of machinery. This was done in order to evaluate its overall noise level and encapsulate the statistical properties of each type of machinery noise. It was made sure that, when noise measurements were conducted, staff would operate the corresponding machine unit in a way that would represent a typical operational mode.

2.3 Equipment

The equipment calibration was verified before and after use and no abnormalities were observed. The equipment used was as follows.

- Svantek Type 957 Class 1 Sound Level Meter
- B&K Type 4231 Class 1 Calibrator

3.0 RESULTS

3.1 Measurement Data

The results of the noise measurements of different areas and activities within the process are shown in Tables 3.1 and 3.2 in terms of L_{Aeq} equivalent, time-average sound pressure levels.

Type of operation/Machine	Comments	L_{Aeq} (dB)
Workshop 1		
Rover A3 (CNC Router)	8hrs/day	87
Akron 840 (Edgebander)	8hrs/day x 3 times per week	88
SCF 8 (Hydraulic Veneer Press)	8hrs/day	83
Mayer (Beam Saw)	8hrs/day	90
Moulder	4hrs/day	97
Surface Planer	6hrs/day	98
Cross-cut Saw	2hrs/day	89
Multi-rip Saw	4hrs/day	100
Rover C6 (CNC Router)	8hrs/day	87

Table 3.1 Overall measured L_{Aeq} levels for different work areas in Workshop 1

Type of operation/Machine	Comments	L_{Aeq} (dB)
Workshop 2		
Spindle Moulder	8hrs/day	90
Tenon Machine	2hrs/day	91
Overhang Planer	Rarely	95

Table 3.2 Overall measured L_{Aeq} levels for different work areas in Workshop 2

In order to construct typical working day scenarios, discussions with staff were undertaken on-site where possible.

3.2 Noise Exposure Analysis Results

Following discussions with staff, some representative typical working day scenarios were constructed and the relative dose levels calculated as shown in Table 3.3, with a 8.5 hour shift assumed (07:30-17:30). Fourty-five minutes have been allowed for breaks and it is assumed that these breaks are taken in a typical canteen setting, where levels have been measured as being in the region of 65dB(A).

Scenario	Total Hours	Description of Activities	Calculated Dose Level $L_{EP,d}$ dB(A)
1	8.5 Hours	2 hours on Rover A3 + 2 hours on Mayer + 2 hours on Moulder + 2.5 hours on Multi-rip Saw + 45mins break	97
2	8.5 Hours	8 hours on Rover A3 + 45mins break	87
3	8.5 Hours	6 hours on Spindle Moulder + 2 hours on Tenon + 45mins break	91

Table 3.3 List of Scenarios Used and calculated Dose values

4.0 DISCUSSION

The two main parameters to take into account when performing a Noise at Work assessment are the noise levels to which an operator is exposed as well as the duration of the exposure. The reference working period is 8 hours. Therefore, longer working shifts would be condensed into an equivalent 8-hour period which would lead to a more onerous assessment.

Currently, the *Lower Exposure Action Value* is a daily ($L_{EP,d}$) or weekly ($L_{EP,w}$) level of 80dB(A) while the *Upper Exposure Action Value* is a daily ($L_{EP,d}$) or weekly ($L_{EP,w}$) level of 85dB(A). The regulations also set out an absolute *Exposure Limit Value* of $L_{EP,d}$ 87dB(A) which should not be exceeded and may take attenuation from hearing protection into account.

The guidelines state that at or above the *Lower Exposure Action Level* hearing protection must be made available to employees. A noise exposure level at or above the *Upper*

Exposure Action Level will require hearing protection to be worn by all exposed employees without exception.

In Table 3.3, scenarios at or above the *Lower Exposure Action Value* are shown in orange. The above scenarios show how this can be met or exceeded with or without hearing protection, respectively.

The need for hearing protection in certain areas would depend on the duration spent with machinery. It was observed onsite that disposable in-ear hearing protection is available in dispensers at certain points around the factory. We would recommend that this is maintained as a good practice.

We would also highly recommend that employees are instructed as to louder identified areas. These are the areas adjacent to the Beam Saw, the Multi-Rip Saw, the Moulder and the Surface Planer in Workshop 1, as well as the Spindle Moulder in Workshop 2. These are the areas where hearing protection must be enforced. In order to demonstrate the effectiveness of a typical industrial-type ear-muff (Peltor, or similar) offering an attenuation figure of 25dB, the overall dose values shown in Table 3.3 would decrease within the Lower Exposure Action Level of 80dB(A).

Huphrey and Stretton PLL Ltd should continue the current regime, making hearing protection available to factory staff and erecting warning signs in identified louder areas

5.0 CONCLUSIONS

A noise survey has been undertaken Humphrey and Stretton PLL Ltd in order to perform a Noise at Work assessment. Noise measurements were conducted on-site and allowed the evaluation of Noise Exposure Levels to which the operators of various types of machinery are exposed.

It has been shown that, depending on operation durations, a number of personnel using machinery could be exposed to levels of noise that will result in a daily exposure exceeding the *Upper Exposure Action Value*.

It has been observed that hearing protection is made available to all factory workers. Humphrey and Stretton PLL should continue their current regime and consequently maintain the current environment, avoiding the risk of irreversible damage to their employees' hearing from over-exposure to noise in the different areas. Certain areas have also been identified where the use of hearing protection should be enforced.

Report by:

Kyriakos Papanagiotou

Director

KP Acoustics Ltd.

APPENDIX A

GENERAL ACOUSTIC TERMINOLOGY

Decibel scale - dB

In practice, when sound intensity or sound pressure is measured, a logarithmic scale is used in which the unit is the 'decibel', dB. This is derived from the human auditory system, where the dynamic range of human hearing is so large, in the order of 10^{13} units, that only a logarithmic scale is the sensible solution for displaying such a range.

Decibel scale, 'A' weighted - dB(A)

The human ear is less sensitive at frequency extremes, below 125Hz and above 16Khz. A sound level meter models the ears variable sensitivity to sound at different frequencies. This is achieved by building a filter into the Sound Level Meter with a similar frequency response to that of the ear, an A-weighted filter where the unit is dB(A).

L_{eq}

The sound from noise sources often fluctuates widely during a given period of time. An average value can be measured, the equivalent sound pressure level L_{eq}. The L_{eq} is the equivalent sound level which would deliver the same sound energy as the actual fluctuating sound measured in the same time period.

L_{10}

This is the level exceeded for no more than 10% of the time. This parameter is often used as a "not to exceed" criterion for noise.

L_{90}

This is the level exceeded for no more than 90% of the time. This parameter is often used as a descriptor of "background noise" for environmental impact studies.

L_{max}

This is the maximum sound pressure level that has been measured over a period.

Octave Bands

In order to completely determine the composition of a sound it is necessary to determine the sound level at each frequency individually. Usually, values are stated in octave bands. The audible frequency region is divided into 11 such octave bands whose centre frequencies are defined in accordance with international standards. These centre frequencies are: 16, 31.5, 63, 125, 250, 500, 1000, 2000, 4000, 8000 and 16000 Hertz.

Environmental noise terms are defined in BS7445, *Description and Measurement of Environmental Noise*.

APPENDIX A

APPLIED ACOUSTIC TERMINOLOGY

Addition of noise from several sources

Noise from different sound sources combines to produce a sound level higher than that from any individual source. Two equally intense sound sources operating together produce a sound level which is 3dB higher than a single source and 4 sources produce a 6dB higher sound level.

Attenuation by distance

Sound which propagates from a point source in free air attenuates by 6dB for each doubling of distance from the noise source. Sound energy from line sources (e.g. stream of cars) drops off by 3dB for each doubling of distance.

Subjective impression of noise

Hearing perception is highly individualised. Sensitivity to noise also depends on frequency content, time of occurrence, duration of sound and psychological factors such as emotion and expectations. The following table is a guide to explain increases or decreases in sound levels for many scenarios.

Change in sound level (dB)	Change in perceived loudness
1	Imperceptible
3	Just barely perceptible
6	Clearly noticeable
10	About twice as loud

Transmission path(s)

The transmission path is the path the sound takes from the source to the receiver. Where multiple paths exist in parallel, the reduction in each path should be calculated and summed at the receiving point. Outdoor barriers can block transmission paths, for example traffic noise. The effectiveness of barriers is dependent on factors such as its distance from the noise source and the receiver, its height and construction.

Ground-borne vibration

In addition to airborne noise levels caused by transportation, construction, and industrial sources there is also the generation of ground-borne vibration to consider. This can lead to structure-borne noise, perceptible vibration, or in rare cases, building damage.

Sound insulation - Absorption within porous materials

Upon encountering a porous material, sound energy is absorbed. Porous materials which are intended to absorb sound are known as absorbents, and usually absorb 50 to 90% of the energy and are frequency dependent. Some are designed to absorb low frequencies, some for high frequencies and more exotic designs being able to absorb very wide ranges of frequencies. The energy is converted into both mechanical movement and heat within the material; both the stiffness and mass of panels affect the sound insulation performance.