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Occupational Risk in a Glass Manufacturing Industry Unit

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Abstract

Risk assessment is one of the main pillars of the framework directive and other directives in respect of health and safety. It is also the basis of an effective management of safety and health as it is essential to reduce work-related accidents and occupational diseases. To survey the hazards eventually present in the workplaces the usual procedures are i) gathering information about tasks/activities, employees, equipment, legislation and standards; ii) observation of the tasks and; iii) quantification of respective risks through the most adequate risk assessment among the methodologies available. From this preliminary evaluation of a welding plant and, from the different measurable parameters, noise was considered the most critical. This paper focus not only the usual way of risk assessment for noise but also another approach that may allow us to identify the technique with which a weld is being performed.

1 Introduction

Risk assessment is one of the main pillars of the framework directive and other directives in respect of health and safety, it is the basis of an effective management of safety and health is essential to reducing work-related accidents and occupational diseases. To survey the hazards present in the workplaces the usual procedures are gathering information about tasks/activities, employees, equipment, legislation and standards, observation of the tasks and, at last, quantification of respective risks through the most adequate risk assessment methodologies. From this preliminary evaluation of a welding plant and, from the different measurable parameters was considered the noise as the most critical.

This paper will present not only the usual way of risk assessment for noise but also another approach that may allow us to identify the technique with which a weld is being performed.

2 Materials and methods

It was used an integrating sound level meter 01dB Solo MASTER accuracy Class 1. Before each measurement, calibration was performed by the sound level meter calibrator

Rion NC-74. The equipment was subject to a test in the workplace, before each series of measurements, in accordance with Portuguese law.

3 Results and discussion

Sound pressure (L) values in locksmith work places.

Table 1 shows the global values obtained from for the L_{eq}, L_{min} and L_{max}, with weighting filter *A* from an 8 hours measurement. Table 2 shows the same variables obtained in a measurement of 3 hours.

Table 1 - Global values of L_{eq}, L_{min} and L_{max}, from the 1st evaluation (8h) to the locksmiths' workplace

	Welding measurement: 08:00					
Begin End	09:30:05 16:49:44					
	description	Filter	Unit	L_{eq}	L_{min}	L_{max}
	L_{eq}	A	dB	84,7	66,3	109,4

Table 2 - Global values of L_{eq}, L_{min} and L_{max}, from the 2nd evaluation (3h) to the locksmiths' workplace

	Welding measurement: 03:00					
Begin End	08:55:52 11:55:52					
	description	Filter	Unit	L_{eq}	L_{min}	L_{max}
	L_{eq}	A	dB	86,8	75,0	101,1

Phenomenological interpretation of the signal

Since most of the noises are complex because they result from the combination of various frequency levels, it is necessary to identify the different frequencies contained therein. The analysis of the spectrum, or frequency analysis, intended to accurately determine the different components of a sound. For the analysis of the frequency ranges were used octave bands.

Noise measurements were made in an attempt to determine the possible existence of a pattern of noise in the performance of oxyacetylene welding and correlate this pattern with the characteristics of the worker or work. These measurements were made over short periods of time, not always equals, because only aimed to capture the task of oxyacetylene welding. This task is the noisiest and is performed about 10 times a day, for each of the 12 workers. In each operating position held up four measurements. In Figure 1 and in Figure 3 shows the graphs of four measurements in the traditional way. In Figure 2 are shown same data with setting a trend line. This measurement corresponds to a welding operation, with the work piece cold. In Figure 4 are shown same data with setting a trend line for a welding operation, with the work piece hot.

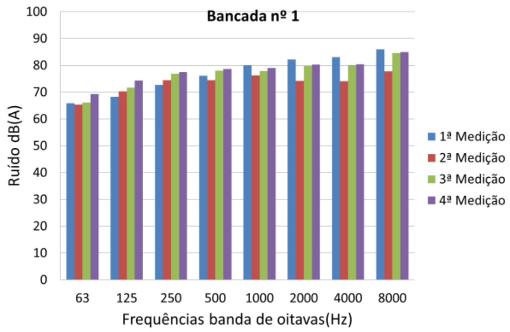

Fig. 1 Values of L_{eq} (A) in dB in the workplace N°. 1 while performing cold welding.

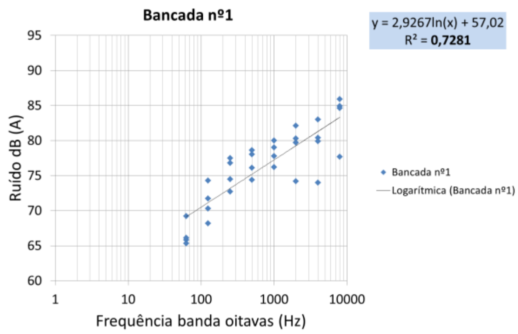

Fig. 2 Values of the trend line chart of Figure 1

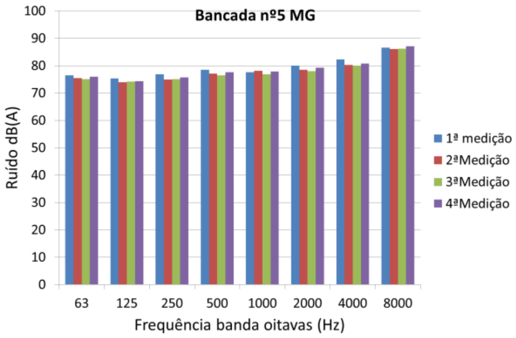

Fig. 3 - Values of L_{eq} (A) in dB in the workplace N^{o}. 4 while performing hot welding.

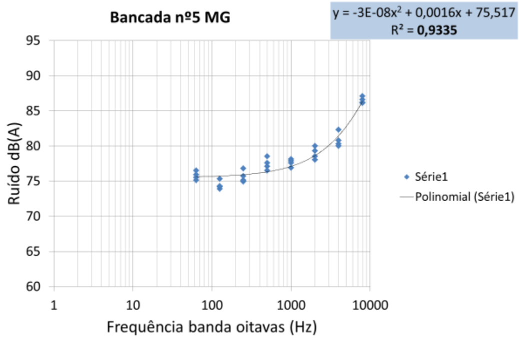

Fig. 4 - Values of the trend line chart of Figure 3

The measurement of the frequency of the signal noise, was performed with the use of Fourier Transform. From the analysis of the adjustment is possible clearly to identify, in the first case the use of a linear function and in the second a function of the second degree. This clearly demonstrates the difference between the two types of welding for similar pieces. This type of analysis should now be deepened and applied to other situations in order to check for reproducibility of results. Occurring this fact, the doors are open to promising new research.

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