RISK ASSESSMENT AND COMBINED EXPOSURE TO NOISE AND SOLVENTS

CASE STUDIES

ABSTRACT

The harmful effects of noise on hearing are now globally recognized and are well documented. It is a common problem in a wide range of industry sectors. However, it is also known that this physical agent interacts with the sole risk factor in the workplace likely to have an impact on workers hearing. Certain substances, defined as toxic, can also cause damage to the auditory system. These substances usually affect the organs of hearing, resulting in an increased risk when combined with noise exposure. The potential for the presence of chemicals that can be ototoxic, "with negative effects on the auditory system, including solvents, metals and asphyxiating. The information currently existing on the subject indicates that workers exposed to ototoxic substances and high noise levels are more at risk of getting a hearing less than workers exposed, separately, to noise or substances. In Portugal, the Act DL nº 182/2006, of 6 September indicates the importance to consider combined exposure noises and ototoxic substances (in risk assessment).

This work aims to address the combined effect of noise and solvents (ototoxic substances). We present cases studies of risk assessment to reflect this combined exposure, preventive measures taken and level of noise and solvents determined. The measurements were realized using internationally recognized methodology, ISO 9612 and NIOSH methods.

METHODS AND INSTRUMENTS

In 2006, article no. 5 of DL no. 182/2006, states: "The activities likely to pose risks of noise exposure, the employer must make an assessment of risks, in particular taking into account the following aspects... the indirect effects on worker safety resulting from interactions between noise and ototoxic substances present in the workplace. ... The Act acknowledges of the possibility of the presence of chemicals that can be ototoxic, "with negative effects on the organs of hearing, resulting in an increased risk when combined with noise exposure. When the noise is associated with these substances, the workers used in the plastic industry and printing industry, as well as in romans and varnishes.

To assess the effects of noise and solvents, we used the following equipment, the following table shows the measurement carried out. The values of the measurements are defined as "risk-based measurements" established by ISO 16017-1:2009. To carry out the samplings were used noise-based methodologies from National Institute for Occupational Safety and Health (NIOSH) and its apparatus.

The solvents were collected samples using the methodology established by NIOSH method 10101 (2004), the results were analyzed using a flow meter from Bios.

In the collection of the solvents were used SAC personal samplers, whose flow was setting and checking before and after sampling using a flow meter from Bios.

DISCUSSION AND CONCLUSIONS

The Table 1 shows same action prevention measures were implemented in workplace. The graphicals 1 and 2 shows the representative graphic of measurements of occupational noise in furniture sector. The graphical 3 shows the representative graphic of measurements of solvents in furniture sector. The results were compared with the limit values established by DL 24/2012 (Silencers) and DL 182/2006 (Silencers). It is important that this risk factor is provided in any risk assessment, this was included in the matrix of hazard identification and risk assessment. Considering our results Xylene and Ethylbenzene presents values not everything cases evaluated. Thus it is assigned a probability level higher than the dangers appear alone. The severity level is related to concentration of the chemical and risk level obtained. Knows this change in methodology, level of risk reduction, employing taking immediate actions (Table 1).

The Table 1 shows some action prevention measures were implemented in workplace.

RESULTS

Table 1 – Prevention Measures

<table>
<thead>
<tr>
<th>Solvent</th>
<th>Prevention Measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Toluene</td>
<td>Replacing the ototoxic solvents with less harmful solvents</td>
</tr>
<tr>
<td>Ethylbenzene</td>
<td>Awareness, information and consultation of workers, employers, occupational health services</td>
</tr>
<tr>
<td>Xylene</td>
<td>Assigning workers to less hazardous tasks</td>
</tr>
</tbody>
</table>

REFERENCES

- NIOS 10101 – Acoustic, Direct measurement of occupational noise exposure – Engineering method
- NIOS 16017-1:2009 – Acoustic, Direct measurement of occupational noise exposure – Engineering method
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