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Focus on IFA's work

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Noise prediction for new production facilities

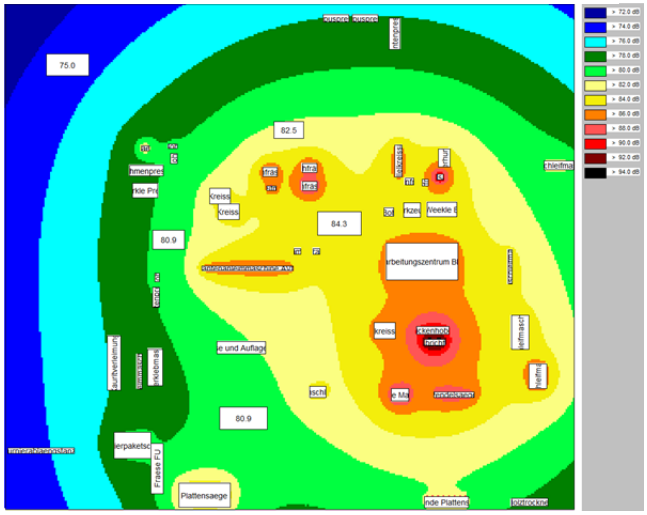
Problem

During the planning of new production installations, timely consideration should also be given to the anticipated noise situation, and measures for noise abatement taken where necessary. Provided noise problems are identified sufficiently early, suitable noise abatement measures can generally be found, for example involving screening or encapsulation of sources of noise, the procurement of new, quieter machines, or measures to modify the room acoustics. Specific measures of this kind can generally be implemented during the planning phase with little additional expense. If measures are not taken until production has already started, substantially higher costs can be anticipated, particularly for measures for modifying the room acoustics.

A woodworking company intended to transfer all production operations to a new and substantially larger shop. It was therefore to be assumed that the noise from the louder machine workplaces would impact considerably upon the adjacent workbench workplaces, and that exposure to noise at levels posing a threat to hearing would consequently arise at all workplaces.

Activities

In order to determine the anticipated noise exposure levels for workers in the new production area, prognostic calculations to VDI 3760 were performed. For this purpose, several variants of the acoustic design of the area were considered to find the most suitable means of satisfying the provisions of the technical rules under the German Ordinance on noise and vibration protection (TRLV). For calculation of the distributions of the sound pressure level, the sound power levels of 55 machines, i.e. sound sources, that were to be accommodated in the new areas had to be determined. The sound power levels were determined both by sound measurements conducted for reference purposes in the previous production areas, and from manufacturers' data.



Sound pressure level distribution calculated to VDI 3760 for a woodworking company

Results and Application

According to the prognostic calculations, exposure to hazardous sound levels of between 85 and 90 dB(A) was to be anticipated virtually throughout the shop in the absence of room acoustic measures.

In order for the provisions of the TRLV technical rules on noise to be satisfied, 80% of the ceiling area was to be made sound-absorbent. This measure enables the sound pressure level to be kept below 85 dB(A) in large areas of the shop. At the workplaces close to the machines, reductions in the levels of approximately 2 to 4 dB(A) were noted, and at the planned workbench workplaces of approximately 6 to 7 dB(A), resulting in anticipated levels of approx. 75 dB(A).

Area of Application

All production facilities.

Additional Information

- VDI 3760: Berechnung und Messung der Schallausbreitung in Arbeitsräumen (02.96). Beuth, Berlin 1996

- Maue, J.H.: Erfahrungen mit Lärmprognosen für Arbeitsräume unter Anwendung der VDI-Richtlinie 3760. Sicherheitsingenieur (1998) Nr. 10, S. 16-20 und (1998) Nr. 11, S. 22-24

- Maue, J. H.: Geräuschimmissionsprognosen im Rahmen von Lärmminderungs-Betriebsberatungen. Sichere Arbeit (2002) Nr. 6, S. 24-28

Expert Assistance

IFA, Division 4: Ergonomics – Physical environmental factors

Literature Requests

IFA, Central Division

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Edited by: Dr Jürgen Maue
Institut fuer Arbeitsschutz der Deutschen
Gesetzlichen Unfallversicherung (IFA)
Alte Heerstrasse 111, 53757 Sankt Augustin, Germany
Phone: +49 2241 231-02/Fax: -2234
E-mail: ifa@dguv.de, Internet: www.dguv.de/ifa