IFA
Institut für Arbeitsschutz der
Deutschen Gesetzlichen Unfallversicherung

0447

Focus on IFA's work

Issue: 12/2024

Study of the unwinding noise generated by a range of adhesive tapes used in industrial applications

Problem

Across industry, the noise generated by adhesive tape as it unwinds off the roll during the packaging of products causes workplace sound pressure levels that may be potentially harmful to hearing. This noise is also perceived as annoying and unpleasant, and therefore has effects besides those on the hearing.

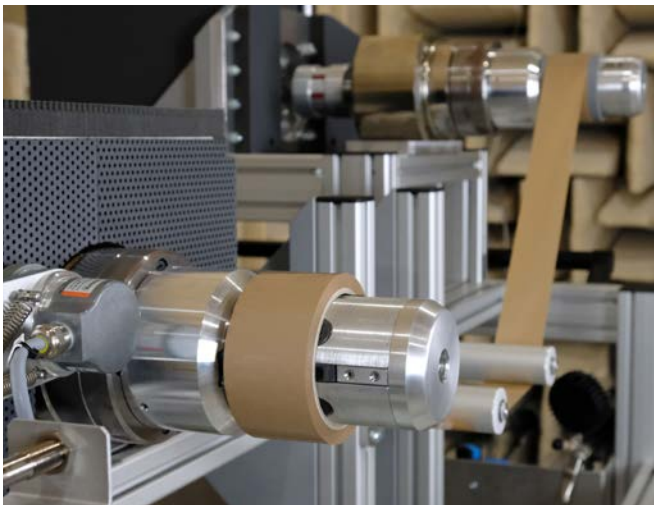
Some manufacturers are now advertising "low-noise" adhesive tape. Is this merely for marketing purposes, or does it present an opportunity for occupational safety and health?

Activities

To determine whether the sound pressure levels generated by different adhesive tapes differ significantly, the German Social Accident Insurance Institution for the foodstuffs and catering trade (BGN) conducted a research project in conjunction with the IFA. The project examined the unwinding noise of a number of adhesive tapes under comparable laboratory conditions. The machine-specific standards do not contain a measurement specification for this purpose. A suitable measurement strategy was therefore first developed within the project.

Market research yielded an overview of the common adhesive tapes available on the market.

Measurements in member companies of the BGN and extensive searches in the MELA database of measured data on workplace exposure to noise yielded information on noise exposure at workplaces in packaging operations involving manual tape dispensers and carton sealing machines.



Adhesive tape unwinding machine designed at the IFA

Together with the IFA's noise specialists, the institute's in-house development workshops planned, designed and fabricated a suitable adhesive tape unwinding machine for systematic laboratory study of unwinding noise. A measurement method for use in the systematic study was developed and trialled. In this method, a measurement microphone records the unwinding noise at an axial distance of 50 cm from the adhesive tape as it is unwound.

Based on existing standards for the unwinding force of adhesive tape, thirteen different adhesive tapes used for industrial purposes were tested at two different speeds. To eliminate interference from background noise, the sound pressure level, spectra and level-time curve of the unwinding noise were recorded in the IFA's acoustics laboratory.

Results and use

Irrespective of the unwinding speed, substantial differences in sound pressure level of around 15 dB were observed between the adhesive tapes tested. Manufacturers' claims of quiet unwinding or labelling of the products as "low-noise" adhesive tapes were not borne out by direct comparison of the products. In the absence of a uniform measurement method or test standard, manufacturers' data is simply not comparable and does not serve as an objective basis for a purchase decision. The occupational safety and health principle of reducing risk to a minimum cannot therefore be applied in practice.

However, the project was able to demonstrate that the choice of adhesive tape alone may be sufficiently decisive to enable the measures taken in packaging operations for protection against harm to hearing, which up to now have been mandatory, to be dispensed with.

Future studies should also take further factors into account: these include the temperature (which is relevant for deep-freeze packaging operations) and also the sound emission characteristics, measuring position and measuring method used.

User group

All sectors in which packaging machinery is used

Technical enquiries

- IFA, Department "Ergonomics – Physical Environmental Factors"

Literature enquiries

- IFA, Department "Interdisciplinary Services"

Further information (in German)

- Untersuchung der Schallabstrahlung von unterschiedlichen industriell genutzten Klebebändern. Proceedings, 49th Jahrestagung für Akustik, DAGA 2023 in Hamburg.

- Untersuchung der Schallabstrahlung von unterschiedlichen, industriell genutzten Klebebändern. Ronny Herzog, Markus Haaß, Ingo Albrecht, Jan Selzer – Lärmbekämpfung 19 (2), 2024, S. 38-44. Doi: 10.37544/1863-4672-2024-02-8

Published by:
Deutsche Gesetzliche Unfallversicherung e. V. (DGUV)
Glinkastrasse 40 · 10117 Berlin
ISSN (Internet): 2190-006X

Subscription:
www.dguv.de/publikationen Webcode: p022706

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