

No. 0134: Protection from vibration by using low-vibration equipment and machines

○ Problem

Users of hand-held powered equipment and machines are exposed to vibration. High vibration over a prolonged period can cause health damage. Costs amounting to about €30 million per year are incurred by the statutory accident insurance institutions due to vibration-related disorders of the hand-arm system, i.e. occupational diseases 2103 "Diseases caused by vibration at the workplace from pneumatic tools" and 2104 "Vibration-related circulatory disorders in the hands (white finger disease)".

○ Activities

To make it possible to compare the vibrations caused by equipment, the vibration values are determined under standardized measurement conditions. The degree of vibration is expressed by the assessed acceleration a_{hw} in m/s^2 . Under the EC Machinery Directive 89/392/EEC, manufacturers of hand-held equipment are obliged to state the vibration value in the instructions.

The vibration measured under real working conditions in the course of risk assessment may deviate from this value. The BG Institute for Occupational Safety and Health (BGIA) determines vibration values and ascertains the vibration at the workplace.

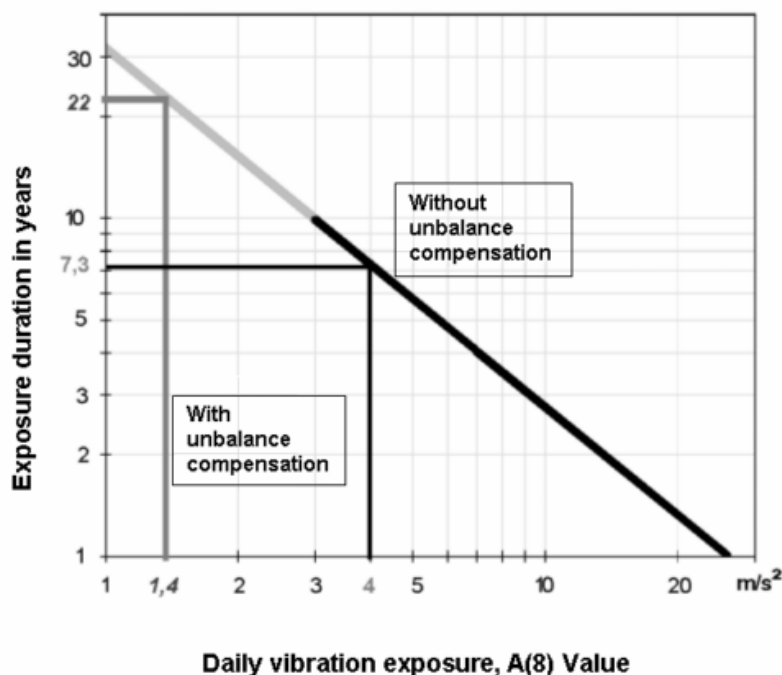


Illustration
Assessment of the
risk of white finger
disease from
grinding
(to DIN EN ISO
5349-1)

○ **Results and Application**

The figure shows an example of the reduction of the vibration risk with technical vibration protection measures on a low-vibration, unbalance-compensated grinder compared to a conventional grinder. The data refer to a daily vibration load A(8) with a daily exposure time of 2 hours and 45 minutes.

If a conventional grinder is used with a daily vibration exposure of 2 hours and 45 minutes, there is a risk of contracting white finger disease after seven years. If a low-vibration grinder is used, this risk only arises after 22 years.

○ **Area of Application**

Construction industry, metalworking industry, crafts & trades

○ **Additional Information**

- Kaulbars, U.: Messung, Bewertung und Beurteilung der Hand-Arm-Vibrationsbelastung an Arbeitsplätzen. Sicherheitstechnisches Informations- und Arbeitsblatt 210 520. In: BGIA-Handbuch Sicherheit und Gesundheitsschutz am Arbeitsplatz. 28. Lfg. XII/96. Ed.: Berufsgenossenschaftliches Institut für Arbeitsschutz – BGIA, Sankt Augustin. Erich Schmidt, Berlin 1985 – Loose leaf edition
- EN 28 662-1: Hand-held portable power tools. Measurement of vibrations at the handle. Part 1: General requirements (01.93) and subsequent parts. Beuth, Berlin 1993
- EN ISO 5349: Mechanical vibration. Measurement and evaluation of human exposure to hand-transmitted vibration. Part 1: General requirements. Part 2: Practical guidance for measurement at the workplace. Beuth, Berlin 2001
- VDI 2057: Einwirkung mechanischer Schwingungen auf den Menschen. Blatt 2: Hand-Arm-Schwingungen (09.02). Beuth, Berlin 2002
- DIN V 45 695: Hand-Arm-Schwingungen – Leitfaden zur Verringerung der Gefährdung durch Schwingungen – Technische und organisatorische Maßnahmen (04.96). Beuth, Berlin 1996

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[BGIA, Division 4: Ergonomics – Physical environmental factors]

⇒ Literature requests: BGIA, Zentralbereich [BGIA, Central Division]

○ **“Focus on BGIA’s work”**

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