

Focus on BIA's work

Berufsgenossenschaftliches Institut für Arbeitsschutz

No.: 0163 Hand-arm vibration from working with sanding machines

○ Problem

In the steel and shipbuilding industries, processing welding seams is associated with much manual labor. The traditional method of doing this work has so far been to use **hand-held angle sanders**, which causes a high degree of vibration stress and strain on the hand-arm region. One user developed a **hand-guided belt sander** to improve quality and performance. By changing the technical method of functioning, the intent was also to reduce the amount of vibration. Both work procedures were measured and recorded and compared in order to analyse the hazards and to verify the improvements.



Illustrations

Processing welding seams with a hand-held angle sander (left) and the hand-guided belt sander (right)

○ **Activities**

The measurements were conducted under typical working conditions. The degree of strain described as "acceleration value of the frequency-weighted hand transmitted vibration" was analysed separately for three measurement axes at the respective periods of exposure. Additional measurements were made on the support handle of the angle sander.

○ **Results and Application**

In processing welding seams, the hand-held angle sander produced values for the "acceleration value of the frequency-weighted hand transmitted vibration" on the support handle of $a_{hw} = 11.5 \text{ m/s}^2$ which diverged considerably from the claims of the manufacturer, given at $a_{hw} = 7.0 \text{ m/s}^2$, by more than 60%. The hand-guided belt sander reduced the vibrations substantially, with an acceleration of vibration of $a_{hw} = 0.77 \text{ m/s}^2$ in comparable work situations.

The hazards of hand-arm vibrations from the hand-held angle sander is already exceeded with a daily exposure of more than 24 minutes. In contrast, the hand-guided belt sander produces values below the suggested prevention threshold values even at a daily exposure of eight hours.

○ **Area of Application**

The metal-working, steel, and shipbuilding industries.

○ **Additional Information**

- DIN EN ISO 8662-4: Handgehaltene motorbetriebene Maschinen - Messung mechanischer Schwingungen am Handgriff (06.95). Teil 4: Schleifmaschinen. Beuth, Berlin 1995
- DIN V 45695: Hand-Arm-Schwingungen - Leitfaden zur Verringerung der Gefährdung durch Schwingungen - Technische und organisatorische Maßnahmen (04.96). Beuth, Berlin 1996

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○ **"Focus on BIA's work"**

Published by:

Berufsgenossenschaftliches Institut für Arbeitsschutz – BIA
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