

# Focus on IFA's work

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## Hand-arm vibration during work on woodworking machines

### Problem

Both stationary and hand-held mobile machines are employed for woodworking. On stationary machines, vibration is often transmitted through the workpiece, and not, as in the case of mobile machines, through the handles of the machine. Stationary machines are not subject under the EU Machinery Directive to mandatory declaration of vibration emissions data. In order to support companies in hazard assessment, exposure parameters were to be measured.

### Activities

Representative measurements were performed under typical working and operating conditions on the following machines: surface planer, vertical spindle moulder, panel sizing circular saw, jigsaw and sanding machine. The "total vibration value"  $a_{hv}$  employed as the exposure parameter was measured several times on each machine.

### Results and Application

Of the machines studied, only the surface planer exhibited total vibration values in the range hazardous to health under intensive daily use, at  $a_{hv} = 2.2 \text{ m/s}^2$  to  $3.9 \text{ m/s}^2$ .

The action value (under the EU directive) of  $A(8) = 2.5 \text{ m/s}^2$  for protection measures is reached in this case after 3.3 hours' exposure. The permissible



Surface planer, stationary (top), and jigsaw, mobile (below)

duration of use may thus be estimated to be 6 to 7 hours per day. The total vibration values for the mobile machines studied (jigsaw and sanding machine) differed strongly in practical use, at  $a_{hv} = 13.2 \text{ m/s}^2$  and  $12.4 \text{ m/s}^2$ , from those indicated in the manufacturers' instructions, namely  $a_w = 6 \text{ m/s}^2$  and  $a_w \leq 2.5 \text{ m/s}^2$ . A hand-arm vibration hazard may thus arise on these mobile machines when a daily exposure of only 17 to 20 minutes is exceeded.

### Area of Application

Woodworking and furniture industry, trade sector

### Additional Information

- DIN 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 (12.01). Beuth, Berlin 2001
- VDI 2057: Human exposure to mechanical vibrations. Part 2: Hand-arm vibration (09.02). Beuth, Berlin 2002
- Directive 2006/42/EC of the European Parliament and of the Council of 17 May 2006 on machinery. OJ EC L 157, 9 June 2006, pp. 24-86. Transposed in Germany as the 9<sup>th</sup> Ordinance of the Produktsicherheitsgesetz (Equipment Safety Act, 9. ProdSV), 12 May 1993. Federal Gazette I (1993), p. 704, as amended by Art. 19 G on 8 November 2011. Federal Gazette I (1995), p. 1213
- Lärm- und Vibrations-Arbeitsschutzverordnung (LärmVibrationsArbSchV) vom 6. März 2007. BGBl. I (2007), S. 261-277
- Council Directive 89/391/EEC of 12 June 1989 on the introduction of measures to encourage improvements in the safety and health of workers at work. OJ EC L 183 of 26 June 1989, pp. 1-8
- Schwingungs-Belastungs-Rechner für Hand-Arm-Vibration [www.dguv.de/webcode/d3245](http://www.dguv.de/webcode/d3245)

### Expert Assistance

IFA, Division 4: Ergonomics – Physical environmental factors

### Literature Requests

IFA, Central Division