

Focus on BGIA's work

Berufsgenossenschaftliches Institut für Arbeitsschutz

No.: 0241 Whole-body vibration exposure during fork-lift truck travel over ramps

○ Problem

Fork-lift truck drivers complained of pain in the region of the lumbar and thoracic spine during repeated travel over ramps (ramp angle: 15.5°). Exposure to vibration containing a shock element was regarded as the cause.



Illustration
Fork-lift truck
negotiating a
ramp

○ Activities

The existing vibration exposure situation on the truck seats was first recorded in the two horizontal axes of vibration x (back-chest axis of the driver) and y (shoulder-shoulder axis), and in the vertical axis of vibration z (spinal axis). The source of the shocks giving rise to the complaints was suspected to be insufficient spring travel in the vertical axis of the suspension seats fitted. The manufacturer's preferred seat supplier was therefore requested to supply improved suspension seats with greater spring travel. The vibration generated in the existing seats was compared in the BGIA's seat test laboratory with that of the improved seats. The seats deemed suitable on the basis of this comparison were fitted to the fork-lift trucks in the plant, and the new vibration exposure measured in practical use.

○ **Results and Application**

Two seats with a greater spring travel than that of the original seats, and with two different damper characteristics were initially selected on the basis of the laboratory results. The selection was confirmed by use in the plant: the seat with the harder damper characteristics proved to be suitable. It improved vibration attenuation in the vertical axis on the seat compared to excitation at the seat mounting point from 55% to 65%, without the spring reaching the end of its travel. The reason for the previously unsatisfactory seat function was an unusually high vibration excitation for the load capacity class of the truck, caused by the transitions to the ramp.

○ **Area of Application**

Goods handling and transport by fork-lift truck

○ **Additional Information**

⇒ Expert assistance: BGI, Fachbereich 4: Arbeitsgestaltung – Physikalische Einwirkungen
[BGI, Division 4: Ergonomics – Physical environmental factors]

○ **“Focus on BGI's work”**

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