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Focus on IFA's work

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Whole-body vibration strains on drivers of lorries of up to 7.5t

Problem

The long-term occupation as a lorry driver can cause complaints and ailments of the back due to the vertical whole-body vibration in the seated position – the effects of which may even result in diseases of the lumbar vertebrae in extreme cases (an occupational disease in Germany: BK 2110).

Aside from the vehicle suspension, it is the driver's seat that has the best potential of reducing the vibrations preventatively before they adversely affect the spine. As a basis for optimising the seats, the amount of vibration energy and its frequency distribution must be known.

Activities

Lorries with a maximum legal weight of up to 7.5 tons are considered under actual operating conditions in the course of workplace consultations and separate series of measurements. The effects of the vibrations on the seat were measured as frequency-weighted acceleration in vehicles that were mostly partly loaded.

Together with the daily exposure time this frequency-weighted acceleration provides a unit of measure for evaluating the health risks of vibration at the workplace (pursuant to VDI 2057-1:2002). At the same time the frequency-weighted acceleration and the power-density spectrum at the seat mounting point were also determined.

Test vehicle

Results and Application

On the basis of the measurement results, the effects of vibration under normal use of the vehicles can be evaluated dependent on the type of vehicle, its legal maximum weight and the type of driver's seat. These make it possible to formulate a description of the insulating effects of the seat against vibrations and to make suggestions for seating improvements.

According to the present findings, lorries under 7.5 tons are comparable to those over 7.5 tons in terms of their vibration frequency. The values of the frequency-weighted acceleration are, as expected, somewhat lower for lorries under 7.5 tons.

Area of Application

All branches of industry that use distribution and delivery; mainly delivery, freight hauling, logistics businesses.

Additional Information

- VDI-Richtlinie 2057-1: Einwirkung mechanischer Schwingungen auf den Menschen – Ganzkörper-Schwingungen (09.02). Beuth, Berlin 2002

- Fischer, S.; Göres, B.; Gondek, K.-H.; Sayn, D.: Schwingungseinwirkung an Arbeitsplätzen von Kraftfahrern auf Lkw bis 7,5 t zul. Gesamtgewicht. BIA-Report 3/2002. Hrsg.: Hauptverband der gewerblichen Berufsgenossenschaften (HVBG), Sankt Augustin 2002, www.dguv.de/webcode/d6514

Expert Assistance

IFA, Division 4: Ergonomics – Physical environmental factors

German Social Accident Insurance Institution for the transport industry, Hamburg

Literature Requests

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