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Focus on IFA's work

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Hand-arm vibrations from impact screw and nut drivers

Problem

Pneumatic impact screw and nut drivers are used in tyre mounting in vehicle repair shops. Particularly in mechanic's shops that mount lorry tyres, very powerful drivers are needed that can cause considerable vibration exposure to the user's hand and arm. Vibration was measured under real conditions of use with the aim of analysing the potential hazards and developing preventative measures.

Activities

The measurements were taken under typical working conditions and under the consideration of the influence that the operator has on the effects of the device. The exposure values for the "frequency-weighted hand transmitted vibration acceleration" were analysed separately for the conditions "loosening the nut" and "tightening the nut" with their respective periods of exposure.

Results and Application

The frequency-weighted r.m.s.-acceleration values (a_{hw}) recorded were in a range of 15.1 – 23.7m/s^2, which varied considerably from the stated value of the manufacturer (12.2m/s^2), which is in conformity to the EC machine directive. The cause of this variation was identified in the higher operating pneumatic pressure commonly found in everyday use.

Pneumatic drivers in use for mounting tyres

A related study conducted by the then Institution for statutory accident insurance and prevention in the vehicle operating trades found that the operating pressure of around 10 bars for filling tyres was not particularly reduced in practice for using the pneumatic impact drivers. The obligatory manufacturer information on the amount of hand-arm vibration can only be used as a basis for hazard assessment if the given parameters for use are observed. In all other situations, new measurements are necessary under real conditions.

Area of Application

Metal-working, fine mechanics, motor vehicle repair and maintenance

Additional Information

- DIN V 45695: Hand-arm vibration – Guidelines for vibration hazards reduction – Engineering and management measures (04.96). Beuth, Berlin 1996

Expert Assistance

IFA, Division 4: Ergonomics – Physical environmental factors

Literature Requests

IFA, Central Division

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