PREVENTION OF VIBRATION WHITE FINGER

Vibration white finger (VWF) is a problem that can affect workers using vibrating tools and equipment for even short periods of time each day. Symptoms vary from slight numbness and tingling in the fingers to very severe loss of grip strength and dexterity that in extreme cases can leave sufferers unable to drive or do up buttons.

Low vibration tools greatly reduce the risk of VWF, but purchasers of power tools often face a lack of reliable data on the actual vibration levels produced by various tools in use. Many manufacturers' data relates only to the vibration produced when the tool is free running, and vibration levels can increase dramatically under load.

In an effort to sort the claims from reality we carried out a series of vibration analyses on a number of models from our range of low-vibration nut runners. The tests were completed in 1999 in Norbar's research centre to measure the vibration produced by the tools when operated with their 72mm and 108mm diameter air motors and 48V DC electric motor.

The tests were carried out in accordance with ISO 8662-7 1997: Hand-held portable power tools – measurement of vibrations at the handle. This standard requires an output speed of 6 to 12 rpm and the tests were performed with the tools under slight load at 9 rpm. An accelerometer was attached to the handle of each tool by means of a tri-axial mounting block, which once the block was clamped to the handle allowed measurement of vibration in three axes.

The highest recorded readings were seen when the tools was used with the electric motor, which gave an arithmetic mean vibration level of 0.96m/s^2. Average vibration levels for all three power sources were much lower than this level, with more typical readings between 0.4m/s^2 and 0.7m/s^2 when using the tool with the air motor.

There is yet no UK legislation covering maximum levels of exposure to vibration, though discussions are taking place in the European Commission on a proposed Directive requiring employers to carry out a risk assessment and take specific measures when action levels are exceeded.

The Health & Safety Executive (HSE) has however set a recommended safe limit of 2.8m/s^2 as the mean acceleration to which hands are subjected for an eight hour period, and while there is no universal agreement on a 'safe' level of vibration studies in Germany, Japan and the UK have indicated that exposures to vibration levels of less than 1m/s^2 are unlikely to cause injury.

"Our Pneutorque torque tools are almost free from measurable vibration, and are increasingly specified throughout the world to replace other fastener assembly tools which do exhibit vibration, be it above or below 2.8m/s2," says Norbar managing director Neill Brodey.

Peter Wilson, a director of noise and vibration prevention consultancy Industrial Noise and Vibration Centre (INVC), says a big problem facing employers is that when selecting tools they often rely on manufacturer' data because it has been assessed under laboratory conditions.

"Manufacturers could supply realistic data from workplace trials but the problem is that these vary a lot." He says.

Wilson says that while some tool manufacturers have made genuine efforts to reduce vibration they have a difficult job getting the message out to purchasers.

“Everyone is making claims for their equipment” he says. “We have seen one chipping hammer that claimed to produce less than 2.5m/s^2 but in field trials produced eight times that level.”

Wilson says VWF is a greatly under-reported problem, despite HSE research indicating that over 1.2 million workers are exposed to vibration levels at which the HSE recommends that employers should be taking action. Employers are now however beginning to sit up and take notice as claims for damages resulting from VWF are now exceeding £100,000 for the worst affected individuals.

“Hundreds of new cases of VWF are assessed each year by the Department of Social Security under the Industrial Injuries Disablement Benefits Scheme” says the HSE in its leaflet Health Risks from Hand-Arm Vibration. “VWF is one of the most common reasons for occupational ill health claims made against employers.”

While ignorance of the risks among employers is still a major issue even those firms who recognise their workers may be at risk of VWF do not have any easy task. Even short exposures to severe hand-arm vibration can trigger VWF, and it is difficult for employers to determine with any certainty if workers’ exposure to vibration is excessive.

The HSE says that as a rule of thumb anyone using hammer action equipment for more than half an hour a day, or rotary or other action equipment for more than two hours a day, is potentially at risk from hand-arm vibration.

The use of “anti-vibration gloves” as a measure to reduce the risks of VWF is dismissed by Wilson, who says at best they don’t work and at worst can increase the dangers.

The HSE recommends regular health checks of the workforce for early symptoms of VWF to prevent problems developing and Wilson says that one of the best methods of detection can lie in the workers’ own hands.

“If it feels high risk then it probably is” he says. “If your fingers start to tingle or feel numb then the risk is probably very high”.

For further information:

HSE publications are available from HSE Books on 01787 881165. Guidance is also available on HSE’s InfoLine on 0541 545500.

The Industrial Noise and Vibration Centre can be contacted on 01753 530414.