Protecting people from vibration

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Human exposure to vibration can be thrilling or annoying, therapeutic or hazardous, stimulating or disturbing. Vibration can be transmitted to the body through the extremities: 'hand-arm vibration' (HAV), or through the floor and seats: 'whole-body vibration' (WBV). Depending on the frequency content, magnitude and exposure time, vibration can constitute a direct health risk, could be a distraction, or could cause activity interference and a reduction in performance. There are many strategies that can be employed to protect people from vibration, but these need to be appropriate for the application. In broad terms, protection can be achieved through minimisation at source, isolation, and management.

WBV is often an inherent part of work machine operation. Although better vehicles can reduce the vibration experienced by the operator, it is often the work surface being driven over that is the root cause of the vibration. Sometimes maintenance of roadways can reduce the vibration, but often machines are required to work difficult terrain. Ergonomically designed seats with well engineered suspension systems can minimise adverse effects of vibration. Skilled operation of vehicles can effectively reduce vibration exposures. This can have additional benefits of reduced maintenance costs and reduced fuel consumption.

It is often possible to modify work processes to reduce HAV. This can be achieved through better design, or selection of vibration-reduced equipment. It is difficult to isolate workers from HAV. Although 'anti-vibration' gloves are available, their effectiveness is unproven. Exposure management needs careful planning and can be difficult due to unpredictable work requirements from day-to-day.

Dr. Neil Mansfield is Reader in Human Factors Engineering at Loughborough University. He has been active in the field of Ergonomics / Human Factors since 1990 with special interest in hand arm / whole body vibration and industrial vehicle design. His work has included collaboration with companies and research bodies from Europe, Asia and North America working on product refinement, comfort, health and performance. Application areas have included road and rail transport, off-road machines, healthcare, power tool design, and military. He is author of the book ‘Human Response to Vibration’ and Editor of the Journal ‘Ergonomics’. He convenes the ISO working group responsible for ISO 2631-1, the standard used for whole-body vibration risk assessment.