

## Vibration Project Fact Sheet

# Whole-body Vibration Measurement

**OBJECTIVE:**  
*To highlight health effects  
associate with WBV  
exposure and illustrate the  
methods used to  
measure WBV.*



## Background

Whole-body vibration (WBV) occurs when one stands, lies, or sits on a vibrating surface. The vibration can be transmitted throughout the whole body. Operators of transport vehicles, haulage trucks, load-haul-dump vehicles, forklifts, tractors, locomotives, automobiles, are exposed to potentially harmful levels of WBV.

These harmful levels of vibration can either directly or indirectly connected to many health problems including nervous, circulatory, and digestive system problems, noise induced hearing loss, degenerative changes to the spine, as well as disturbances of pregnancy and disorders of the female reproductive organs. The health effects seen with WBV exposure depend on the magnitude, direction (axis), frequency, and duration of exposure to vibration.

## Methodology

The measurement of whole-body vibration is conducted in accordance with the guidelines set out in the ISO 2631-1 standard. An accelerometer is placed between the individual and the vibration source at the point of contact.

The ISO 2631-1 standard also provided guidance on how to process the vibration signal. The most common processing method results in a frequency weighted rms (root mean square) acceleration value expressed in  $m/s^2$ . The rms acceleration is determined for each basicentric axis, and the axis with the dominant signal is used to determine health effects according to the ISO 2631- 1 Health Guidance Caution Zones. For an 8 hour shift a frequency weighted rms value,  $<0.45m/s^2$  - no major health effects anticipated;  $0.45-0.9 m/s^2$  - caution with respect to health risks (preventative measures required);  $>0.9 m/s^2$  - health risks are likely.

## Applications

- The determination of equipment, job tasks, and occupations, which expose workers to hazardous levels of vibration exposure, is possible.
- The implementation of safer work practices, which could include work rest schedules that are appropriate for particular vibration exposures, and the provision of equipment capable of attenuating vibration levels is possible.

## For more information

**Laurentian University**  
Professor, Tammy Eger  
(705) 675-1151 ext. 1005

This research was carried out in partnership with the Mines and Aggregates Safety and Health Association via funding from the Ontario Workplace Safety and Insurance Board.