

# Whole-body vibration (WBV)

## Explain dangers

Heavy equipment operators are exposed to vibration from bulldozers, backhoes, loaders, skid steers, excavators, and other machines (see chart below).

The three main sources of whole-body vibration (WBV) from heavy equipment are:

1. Low-frequency vibration caused by the tires and terrain
2. High-frequency vibration from the engine and transmission
3. Shock from running into potholes or obstacles.

To determine the health effects of WBV, comparisons were made between operators of heavy equipment and workers in a similar environment who were not exposed to WBV.

With short-term exposure to vibration magnitude at  $1 \text{ m/s}^2$ , workers reported symptoms such as:

- Abdominal and chest pain
- Headaches
- Nausea
- Loss of balance.

Long-term exposure to WBV can cause serious health problems, in particular those related to the spine and the gastrointestinal system.

## Identify controls

Until improved equipment comes on the market, heavy equipment operators should do the following to reduce WBV.

- Report any poorly maintained equipment to your supervisor. A good suspension system and correct tire pressure will help to reduce vibration.
- Report any rough terrain to your supervisor. Other workers may be able to level or smooth out the road.
- If your seat has hydraulic dampers and shock absorbers, adjust the seat to your weight and height.

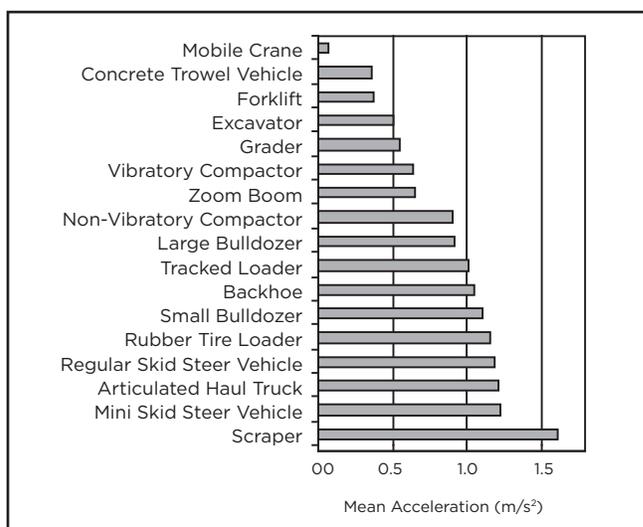
- Slow down when driving over potholes and rough terrain such as shale or rock.
- Get out of your vehicle (in a safe location) for a few minutes every hour to stand, stretch, and give your body a break from vibration.
- Store materials closer to the work location to limit the distance you have to travel. (The layout of a site can be designed to reduce the need to transport materials.)
- Use unmanned equipment to move material where possible (e.g., remote-controlled conveyors).
- Take extra precautions during cold weather. Wear warm, waterproof clothing so that muscles and ligaments stay loose and don't tighten up.

## Demonstrate

Ask the crew to describe any problems they have had with WBV.

Using the vibration chart below, show workers the vibration level of the equipment they will be using.

**Vibration Magnitude of Equipment**



**NOTE:** For eight hours of continuous work, the magnitude of vibration should not exceed  $0.5 \text{ m/s}^2$ .

Source: ISO 2631—The European Vibration Directive.