

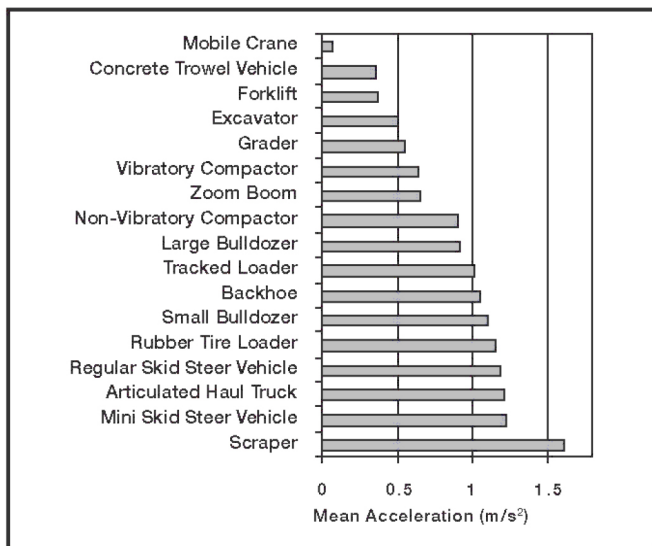
WHOLE BODY VIBRATION

IDENTIFY

Heavy equipment operators are exposed to vibration from bulldozers, backhoes, loaders, skid steer vehicles, excavators, and other construction machines (see graph below).

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

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



COMMUNICATE AND CONTROL

The definition of “mean acceleration” is the change in velocity (Δv) over the change in time (Δt), represented by the equation “ $a = \Delta v / \Delta t$.” This allows you to measure how fast velocity changes in metres per second squared (m/s^2).

The health effects of WBV have been compared for operators of heavy equipment and for workers in a similar environment but who were not exposed to WBV. With short-term exposure to vibration magnitude at one m/s^2 , workers reported symptoms such as abdominal and chest pain, headaches, nausea, and loss of balance.

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

Recommendations

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

- Report any poorly maintained equipment. A good suspension system and correct tire pressure will help to reduce vibration.
- 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.
- Report any rough terrain to your supervisor. Other workers may be able to level or smooth out the road.
- Get out of your vehicle (in a safe location) every hour for a few minutes 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.

THE QUIZ

1. Name two types of equipment that cause whole-body vibration (WBV):

- a) _____
- b) _____

2. What are the three main sources of WBV from heavy equipment?

- a) _____
- b) _____
- c) _____

3. Name two symptoms that workers reported at short-term exposure to vibration magnitude at one m/s^2 :

- a) _____
- b) _____

4. Name two serious health problems caused by long-term exposure to WBV:

- a) _____
- b) _____

5. Name two controls of WBV:

- a) _____
- b) _____

6. What precautions should you take when working in the cold?

7. List the lowest magnitude and the highest according to the chart provided.

Lowest: _____

Highest: _____

8. How often should you take a break from the vibrating equipment?

- a) Every two hours
- b) Every three hours
- c) Every hour

1. Bulldozers, backhoes, loaders, skid steer vehicles, and/or excavators; 2. Low frequency, high frequency, and shock; 3. Abdominal/chest pain, headaches, nausea, and/or loss of balance; 4. Spine, gastrointestinal system; 5. Report poorly maintained equipment, adjust seat, and/or drive slowly on rough terrain; 6. Warm clothing, waterproof clothing; 7. 0.1, 1.6; 8. c

ANSWERS: