

Vibration

Description of Hazard

Vibration exposure is possible in many occupations where a worker comes in contact with vibrating machinery or equipment. Occupational health effects from vibration stem from prolonged periods of contact between a worker and a vibrating surface. Adverse health effects have been shown to occur from vibration at frequencies of 2 to 1,000 Hz (cps).

Potential for Injury or Illness

Hand-arm vibration syndrome (HAVS): Hand arm vibration causes damage to blood vessels and nerves in the fingers. The condition is known as white finger disease, Raynaud’s phenomenon or hand arm vibration syndrome (HAVS). The affected fingers turn white, especially when exposed to cold. Vibration induced white finger disease also causes a loss of grip force and reduced touch.

HAVS is one particular group of symptoms that develop in workers who use hand-held vibrating tools. It is a chronic disorder that can lead to permanent disability, with a latency period that can range from a few months to several years.

Carpal Tunnel Syndrome: Has also been linked to the use of smaller hand-held vibrating tools.

Whole Body Vibration: Operators of heavy vehicles, such as trucks, tractors, buses, forklift trucks, etc., are subject to chronic whole body vibration transmitted through the seat or floor of their workstations. Studies have revealed an increased incidence of disorders of the bowel and the circulatory, musculoskeletal and neurological systems.

Vibration Sources in the Printing Industry

- > forklifts
- > hand tools (e.g., drills)
- > some large presses

Legislation

In the absence of formal regulations, refer to the Threshold Limit Values (TLVs) and guidelines recommended by the American Conference of Government Industrial Hygienists (ACGIH).

Identifying and Assessing Vibration Hazards

Identify the vibration hazards by determining the movements of a vibrating object in different directions. How far and how fast the object moves helps determine its vibrational characteristics such as:

- > frequency (the number of cycles that a vibrating object completes in one second frequency)
- > amplitude (the distance from the stationary position to the extreme position)
- > acceleration (how quickly speed changes with time)

Contact with a vibrating machine transfers vibration energy to a person's body. Depending how the exposure occurs, vibration may affect a major part of the worker's body and particular organs.

Segmental Vibration exposure affects an organ, part or segment of the body. This is most commonly associated with the following tools:

- > powered hammers
- > chain saws
- > riveters
- > compactors
- > sharpeners
- > drills, especially pneumatic drills
- > chisels
- > grinders

Hand-Arm Vibration affects operators working with:

- > saws
- > chipping tools
- > jackhammers
- > jack leg drills
- > grinders
- > many other work-operated, hand-held vibrating tools

Controlling Vibration Hazards

Engineering Controls (at the source)

- > redesign job to minimize use of hand-held vibrating tools
- > when buying new equipment, get the manufacturer's reports on the level of vibration created by the equipment
- > consider buying equipment that operates effectively at lower speeds
- > buy equipment with built-in damping materials
- > replace with manual tools or low vibration tools designed to absorb vibration before it reaches the hand grip
- > use remote controls when they are available
- > mechanically isolate the vibrating source or surface
- > install vibration dampening seats

Administrative Controls (along the path)

- > introduce work breaks to avoid constant continued vibration exposure (e.g., 10-minute break each hour)
- > for whole-body vibration, limit the time workers spend on a vibrating surface
- > screen for workers at risk for developing Vibration White Finger (VWF)
- > put job rotation practices in place
- > ensure that workers with vibrating hand tools can keep hands warm
- > provide tool rests or supports to reduce the gripping required
- > have regular maintenance of tools to keep vibration to a minimum
- > ensure equipment is well maintained

Personal Controls (at the worker)

- > provide anti-vibration gloves
- > provide for warm hands
- > provide for whole body vibration, e.g., provide shock-absorbing footwear

Developing A Health and Safety Action Plan**Health and Safety Training**

- > education about signs and symptoms of Vibration White Finger (VWF)
- > educate workers to employ a minimum handgrip consistent with safe operation

Identify the areas where vibrating equipment is in use and develop an action plan that is aimed at:

- > reducing the vibration
- > removing the workers from the vibrating equipment and tools
- > reducing the time that workers spend on working with the vibrating equipment and tools

Allocate resources, assign responsibility and establish job rotation schedules and timelines so that vibration exposure is minimized.

This document is part of a Health and Safety Guide developed for Ontario's printing industry. To obtain a copy of the guide please contact ...

