MSI PREVENTION GUIDANCE SHEET

Risk Factor: Cold Temperature

WORK SAFE BC
WORKING TO MAKE A DIFFERENCE

Purpose

This guidance sheet was designed to help employers identify and assess whether exposure to cold temperature increases the risks of musculoskeletal injury (MSI). WorkSafeBC's MSI Worksheet A and Worksheet B do not address exposure of the hands and arms to cold temperature. Although evidence suggests an association between exposure to cold and MSI, this evidence is not conclusive. Exposure to cold causes arteries to narrow and reduces the efficiency of muscle and soft tissue by reducing their flexibility. Workers with cold-sensitized hands may grasp more forcefully, exposing muscles, soft tissues, and joints to increased forces. Cold temperature may also increase the harmful effects of vibration.

In the Regulation

Section 4.48 of the Occupational Health and Safety Regulation states:

When factors that may expose workers to a risk of MSI have been identified, the employer must ensure that the risk to workers is assessed.

Background

Occupations that have exposure to cold air temperature, cold object temperature, or discharge of cold gases over an unprotected hand as part of the job may put workers at an increased risk of developing an MSI. In these conditions, some MSI symptoms may be due to the combined effects of cold exposure and other risk factors such as repetition, awkward posture, and excessive force. The *intensity* of the cold may be at least partly responsible for MSI signs and symptoms. Some pre-existing medical conditions (e.g., diabetes or cardiovascular disease) may make a worker more susceptible to the effects of cold. Some medications (e.g., beta-blockers), as well as alcohol, caffeine, and nicotine, may increase the effects of exposure to cold.

Risk identification

Occupations that have the potential for workers' upper extremities to be exposed to cold include:

- Meat cutters
- Grocery clerks who handle frozen foods
- Mechanics
- Warehouse order pickers working in cold storage or freezers
- Lumber graders
- Others working outdoors in the winter

Risk assessment

Cold, as it relates to risk of MSI, has not been precisely defined, so direct temperature measurements may not be that helpful. Evidence shows that meat-processing workers

reported more signs and symptoms of injury when exposed to more severe cold (2° C) compared to less severe exposure (8° to 12° C). In some cases, a worker questionnaire may be appropriate to determine the extent of the exposure. For tasks that require work with bare hands, dexterity may be compromised when the temperature is less than 16°C.

Likewise, the risk of MSI will increase if a worker has cold hands in combination with frequent and/or prolonged exposure to grip force, awkward wrist posture, and hand-arm vibration (HAV). Contact with cold metal surfaces or evaporative liquids such as gasoline, alcohol, or cleaning liquids may also increase the risk of MSI. Evidence also suggests that women lose heat in the extremities more quickly than men.

Consider the following questions when assessing the risk of MSI associated with cold exposure. Answering yes to one or more of these questions indicates that cold temperature on its own or in conjunction with other factors may increase the risk of MSI.

- Is the ambient air temperature below 16°C?
- Are workers' extremities exposed to drafts?
- Are workers exposed to cold temperature for prolonged periods without the opportunity to warm up?
- Are workers dressed inappropriately when working in coolers and freezers?
- Are workers' hands exposed to cold water?
- Are workers using vibrating power tools outside in the cold?
- Are the tasks highly repetitive or do they require forceful gripping?
- Are workers fatigued, hungry, or dehydrated?
- How active is the job? Workers with low activity levels are at a greater risk.

Controls

The employer is required to eliminate or minimize the risk of MSI to workers. Some examples of controls that can be implemented to reduce the risk associated with cold exposure include:

- Environment
  - Reduce drafts by directing air movement away from workers.
  - Provide portable heaters for workers. Plan for the possibility of breakdown.
  - Provide access to hot drinks and warming stations for hands.

- Task
  - Ensure that metal hand tools are stored in a warm place prior to use.
  - Provide alternating periods of warm and cold work (rotate the workers).
  - Provide rest breaks if rotation is not possible.
  - Limit exposure to vibrating tools outside or in cold indoor temperature.
  - Provide tools that reduce forceful gripping or awkward postures, for example, adjustable or bent handles.
  - Minimize forceful gripping, bending wrists and exposure to vibrating hand tools.

- Workers
  - Educate workers on the effects of exposure to cold and signs and symptoms of injury.
  - Encourage workers to stay well hydrated. Ensure workers have well fitting gloves appropriate for the task.
  - Ensure workers wear clothing that keeps them warm without adding too much bulk.