



## **MSI Prevention Guidance Sheet**

### **Risk Factor: Cold Temperature**

Occupational Health and Safety Regulation Section 4.49(d)

#### **Purpose**

Worksheets A and B do not address exposure to cold temperature. This guidance sheet can be used with the worksheets to assess the risks of musculoskeletal injuries (MSI) due to cold temperatures.

#### **Description and general concepts**

Cold air temperature, cold object temperature, and discharge of cold gases over an unprotected hand are all considered to pose a risk of MSI that could affect the lower arm and hands. Cold environments compromise the efficiency of muscle and soft tissue by reducing the flexibility of muscles and joints. Cold also causes the arteries to narrow, allowing less blood to reach the hands, which can lead to “white finger” or Raynaud’s phenomenon. Workers with cold sensitized fingers may grasp loads more forcefully than necessary, exposing muscles, soft tissues, and joints to increased forces. Cold temperatures may also increase the harmful effects of vibration.

Some pre-existing medical conditions and some medications may make a person more susceptible to the effects of cold temperatures. In such cases, the person’s family doctor should be asked for advice. Studies have also shown that alcohol, nicotine, and caffeine increase the risk from cold temperature.

#### **Examples**

Occupations that have the potential for the workers’ hands to be exposed to cold temperature include: meat cutters, grocery workers who stock frozen foods, warehouse order-pickers (dairy/produce/meat) working in cold storage or freezers, mechanics or labourers working outdoors in winter, and lumber graders working in cold temperatures.

#### **Risk identification and assessment**

The severity of risk, or the likelihood that a risk factor may lead to an injury, depends on the magnitude of the risk factor and the influence of other risk factors the worker may be exposed to. For example, a worker with cold unprotected hands might exert 15 pounds of grip force infrequently without being at risk. However, the risk to that worker would increase with increased repetition, say to one grip per minute. 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 postures, and hand vibration.

Consider the following points when doing a risk assessment:

- Are workers exposed to cold temperature for prolonged periods without the ability to warm up?
- Do workers wear appropriate clothing and gloves when working in coolers or freezers?
- Are workers experiencing numb hands?

### **Controls**

The employer is required to eliminate or minimize the risk of MSI to workers. Controls that can be implemented to reduce the risk of MSI due to cold temperature include the following options:

- Ensure that workers wear high-friction, well-fitting gloves.
- Ensure that workers wear clothing that keeps them warm without adding a lot of bulk.
- Ensure that hand tools are stored in a warm place prior to use.
- Provide alternating periods of cold and warm work (worker rotation).
- Avoid having workers use tools that discharge cold gases over the hand.
- Provide portable heaters for workers.
- Educate workers about the adverse effects of cold and its influence on MSI.
- Encourage workers to stay well hydrated.