

Hazards of Working in Cold Work Environments

The Body in Cold Environments

The first thing is the skin gets cold. Blood vessels in the skin and the extremities (nose, toes, fingers, ears) constrict to reduce heat loss. We may begin to shiver if we continue to lose heat: shivering produces extra heat. Prolonged exposure to cold, however, (especially with increasing wetness or moisture) can soon overwhelm this simple benevolent strategy and lead to net body heat loss.

As more heat is lost from our bodies blood flow to the extremities is reduced; our reactions become sluggish and clumsy we may even become disorientated. As a result risks from slips, trips, and falls, objects being dropped from heights, and getting hit by moving vehicles and equipment increase.

Fluids in our tissue can actually freeze. This is *frostbite*. The most common targets of frostbite are the extremities (nose, ears, fingers, and toes). Trenchfoot is a condition like frostbite where the feet become swollen and itchy, and then very painful. Extreme or prolonged cold exposure (usually combined with demanding physical activity) can induce **hypothermia**, a life threatening disorder.

Hypothermia When the body fails to retain and produce heat, core temperatures fall. A victim will shiver uncontrollably, pulse will drop and as the condition worsens shivering stops and pulse rate, blood pressure, and respiration rates fall significantly. In severe cases of hypothermia, the brain is affected and victims are unable to think clearly or move about safely. The lungs fill with fluid (pulmonary edema). And the heart gives out completely. Warning signs of hypothermia are shivering, exhaustion, confusion, fumbling hands, memory loss, slurred speech, and drowsiness.

Cold Work Environments

What constitutes extreme cold and its effects vary by region and by the type of work environment. Temperature is one factor to consider another is wind speed. When the air temperature is 40°F, and the wind speed is 35 mph, the effect on exposed skin is as if the air temperature was 28°F. There also is much variation in the type of work where cold can be a factor. Working conditions of low temperatures, strong winds, wet clothing accelerate risk. Special attention should be given to those who work on or near bodies of water, and attention directed to possible rescue. {Some cold work environments are independent of local weather but are artificially made for certain products and processes.}

Many workers are outdoors for extended periods for example, fishing and farm workers, airline or other transportation ground crews, utility workers, public safety and security, oil and gas workers, snow cleanup crews, sanitation workers, fishing and farm workers, construction workers, facility, maintenance and grounds workers, parking attendants. Some workers may

work indoors but the facility or work space is cold by design such as refrigerated cold rooms or lockers, warehouses, underground vaults or tunnels; or labs where workers work with cryogenics [liquid nitrogen] or dry ice [solid carbon dioxide]. Some transportation, delivery and postal workers move constantly from a shielded environment like a truck and van to outdoor cold exposure. Additional risks include: slips and falls; removing snow from rooftops; working near downed or damaged power lines; driving and/or operating heavy equipment on frozen surfaces.

Select Safety and Health Practices in Cold Work Environments

- Develop a cold safe work practicum.
- Schedule outdoor work during the warmest part of the day, and plan a work/rest schedule to avoid prolonged exposure to the cold. *{The American Conference of Governmental Industrial Hygienists {ACGIH} has a useful chart for cold work schedules in their TLVs and BEI handbook.}*
- Provide heated trailers, shelters, or other warm areas, and take frequent breaks.
- Shield work areas from the wind.
- Heated blankets and electric heaters when work tasks require prolonged exposure. There are many portable electric heating devices that can be used inside temporary or permanent enclosures: *we strongly recommend against propane, or gas/diesel heating tubes as they pose significant carbon monoxide CO exposures within an enclosed space.*
- Working in isolation is a risk, especially in warehousing or near bodies of water. A buddy system helps to reduce threats that an isolated employee may face.
- Clothing and gear should be adequate, layered, insulated, loose, and dry with special attention to hands, face, and feet.
- Regular fluid replacement.
- Workers should be made aware of the signs of cold disorders and be trained when to call for prompt medical attention.
- Workers traveling during excessive cold weather should assemble a cold weather survival kit (includes communication device) in case they are stranded.
- Hold periodic safety briefing/meeting to review cold hazards and safety procedures, especially when a cold snap is predicted.

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