Working on or near Ice Covered Water – Basic Information Fact Sheets



WHY IS WORKING ON ICE A HAZARD?

Falling through ice can result in injuries from the fall, hypothermia, or drowning. Common hazards include:

- being or operating on ice that is damaged or where the ice strength is compromised
- overloading the ice
- being or operating on areas of thin ice
- being or working in the cold

This document covers general considerations when working on or near ice, for example, when driving on an ice road.

What are the characteristics of ice over water?

Fresh water freezes at 0°C, and sea (salt) water freezes at -2°C.

The strength of the ice depends on many factors, including:

- quality of the ice (clear, white, etc.)
- colour of the ice
- thickness of the ice
- the presence of cracks
- the ice and air temperatures during the several days before
- snow cover
- size and depth of water under the ice
- if there is moving or calm water below the ice

For example, solid, clear blue ice forms when water freezes and is generally considered to be the strongest type of ice. White opaque ice (also known as “snow ice” that is formed when there is air trapped in the ice) has a high air content and is not strong.

The strength or integrity of the ice is also affected by:

- dry or wet cracks
- presence of snowbanks
- thermal contraction or expansion cracks
- warming of the ice
- high winds
- water level changes

How thick should the ice be before it is safe to walk or travel on?

Essentially, there is no absolutely “safe” ice.

Ice must have a minimum density to be considered safe to walk or travel on. The thickness and hardness required increase in proportion to the weight of the load and how it is distributed on the ice sheet.

Ice is constantly changing. In addition to the characteristics of the ice mentioned above, the ability of the ice to support a load depends on:

- the weight and distribution of the load(s) on the ice
- an unintended stationary load on the ice (when a load “sits” or stops on the ice)
- the speed of the vehicle
- other traffic or loads on the ice
- frequency of loads
- continuous use areas (such as ice crossings, parking areas, bridge sites)
- reduced ice thickness close to shorelines

Calculations and thickness charts from Work Safe Alberta provide guidelines to help determine the thickness, strength and safety of the ice.

In addition, ice bends when a load is placed upon it. While the ice may appear rigid, ice will flex depending on its temperature, the weight of the load, etc. Cracking may occur when the ice is overloaded. Under extreme loads, the cracks can grow and merge to cause the ice to collapse.

If walking or working on foot.

- minimum ice thickness must be at least 10 cm (4 inches) of clear, good quality ice
- if you plan to be in one area for more than 2 hours, the ice must be at least 15 cm (6 inches)
- check ice thickness by working and walking in pairs. Wear floatation suits and be at least 10 m apart (32 feet)
- be trained in rescue and self-rescue techniques
- do not work alone

What controls can be used when working on ice?

Before travelling on ice, make sure that operators know:

- the integrity of the ice cover
- the load that is to be placed on the ice
- minimum ice thickness

Controls will vary depending on the hazards present, and may include:

- determining the safety of the ice on a continuous basis
- repairing cracks with water and allowing to freeze
- reducing the weight load
- diverting, rerouting, or suspending traffic
- using a buffer zone (e.g., not working within 3 to 5 metres of a cleared area)
- avoiding pressure ridges
- not driving on the ice until its integrity can be confirmed

What are emergency preparedness measures to follow when working on ice?

Have an emergency plan to be followed in the event of breakthrough. Plan how a rescue of a person who has fallen into the ice and water may be done. In addition, drivers in remote areas should be equipped with appropriate survival equipment and food

rations if they are stranded for extended period of time during whiteout conditions.

General tips include:

- Plans, including planned route and a return time, should be left with a responsible person who will follow up.
- Carry an axe or ice chisel, ice auger and air temperature thermometer to measure ice thickness and air temperature.
- A cell phone, satellite phone or two-way radio is recommended for working at remote sites.
- Carry safety equipment such as warning devices (pylons, reflectors, flares, flags) to warn others of danger, rope, and ice picks (keep in your pocket for easy access if you end up in the water), and carry a small personal safety kit that includes a first aid kit, pocket knife, compass, whistle, fire starter kit, etc.
- Wear layers of clothing that provide protection from wind and low temperatures but that will not get in the way of your ability to swim or float if you fell through the ice.
- Wear a personal floatation device (PFD) and mitten-like ice claws. However, if you are in a vehicle and if the PFD may hamper your escape, do not wear one.
- Wear appropriate footwear (rubber treads, crampons) to prevent slipping.
- Buddy up. Never go out on the ice alone, and stay off the ice if there is any chance that it may be unsafe.
- Equipment such as a snow shovel, candles, flashlight, waterproof matches/lighter, fire extinguisher, etc.

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