

SWP Purpose

Trail-building and maintenance work may be conducted under cold conditions. However, the most common work conducted in cold temperatures is trail maintenance. Working in cold temperatures can result in injury, while working in extreme cold temperatures can result in fatality. The purpose of this SWP is to identify and control potential hazards due to work in cold temperatures.

Scope

This SWP applies to all GDTA workers who work in cold conditions, in which the temperature is sufficiently severe to create hazards to workers and negatively affect equipment operation.

Responsibilities

Responsibilities apply to the Trip Manager/Volunteer Lead, all workers, and the Health and Safety Committee.

It is the responsibility of the Trip Manager/Volunteer Lead to

- Discuss the risks of working in cold temperatures with workers/crew
- Implement the guidelines and controls within this SWP
- Reinforce to workers that any recommended controls must be applied consistently

It is the responsibility of the Workers to

- Comply with this SWP
- Ensure recommended controls are implemented and used appropriately.
- Immediately report any near misses or incidents to the Crew Lead
- Operate equipment within the temperature ranges indicated in manufacturers operating specifications

It is the responsibility of the Safety Committee to

- Maintain this Safe Work Practice
- Perform periodic audits to assess that these requirements/SWP are being acted upon.
- Reinforce that recommended controls are to be implemented and used appropriately.

Hazards

Wind chill is a combined effect of air temperature and wind on exposed skin. The wind chill index relates wind and temperature to its effect on exposed skin at 5 feet of elevation. Environment Canada will issue wind chill advisories, warnings, and alerts when weather conditions are notably hazardous. As wind chill increases, risks to the body increase, with rapid cooling of the body leading to potential for serious medical conditions and even death. The most serious concern is the risk of hypothermia or dangerous overcooling of the body. Another serious effect of cold exposure is frostbite or freezing of the exposed extremities such as fingers, toes, nose, and ear lobes. Hypothermia could be fatal in absence of immediate medical attention.

Wind chill warnings in Alberta are issued when there is a wind speed of 15 km/h or more and a wind chill of – 40 and these conditions are expected to last for 3 hours or more.

Most workplaces are not equipped to accurately measure wind speed and air temperature. Workers should refer to local weather reports. Environment Canada offers a free on-line calculator that determines the wind chill value – all you need is the wind speed and temperature. The Environment Canada web site is <http://www.ec.gc.ca/meteo-weather/default.asp?lang=En&n=0F42F92D-1>.

Controls

Controls may include elimination/substitution, engineering, warnings, administrative, and/or PPE.

- Be prepared – check the Environment Canada weather conditions when planning work, when leaving for work; if conditions are hazardous, consider postponing work tasks until conditions improve
- Dress for the temperature, wind chill, and overall conditions. Work in open areas with high wind will require different preparations than working in sheltered, forested areas.
- Discuss hazards with crew members
- Ensure that the correct number of first aiders are with the crew
- Ensure that emergency communication devices are available and operational – note that some devices do not operate well or at all in cold temperatures (e.g. cell phones)
- Be familiar with signs of cold stress, including
 - Reduced dexterity and increasing numbness of extremities (hands, feet)
 - Impaired ability to sense heat, cold, pain
 - Reduced joint flexibility
 - Reduced grip strength
 - Hypothermia
 - Frostbite
 - Reduced coordination
 - Reduced rational, decision-making capacity
- Be aware that clothing worn for protection against cold may have its own safety hazards. Hats, hoods, balaclavas may limit capacity to hear and see
- Bulky clothing restricts free movement
- Gloves and mittens limit dexterity and sensation
- Footwear may be bulky and oversized, resulting in difficulties in using vehicle controls/pedals
- Added bulk and weight increases the amount of effort required to move, resulting in faster rate of fatigue/exhaustion
- Hypothermia and frostbite occur gradually; be aware of how you feel and check other crew members
- When working in cold temperatures, limit the length of exposure and ensure that warm areas are available for rest breaks (e.g. truck cab, trails center)
- Dehydration in the cold is a risk, which increases the risk of hypothermia; drink warm fluids

- Symptoms such as severe shivering, excessive fatigue, drowsiness, irritability are signs to return to warmth/shelter
- Appropriate clothing is a critical control; wear appropriate clothing to maximize warmth while working; layer clothing
- The CCOHS table below provides guidelines for length of exposure under variable cold conditions.

Work/Warm-up Schedule for Outside Workers based on a Four-Hour Shift											
Air Temperature - Sunny Sky		No Noticeable Wind		Wind 8 km/h (5 mph)		Wind 16 km/h (10 mph)		Wind 24 km/h (15 mph)		Wind 32 km/h (20 mph)	
°C (approx)	°F (approx)	Max. work Period	No. of Breaks**	Max. Work Period	No. of Breaks	Max. Work Period	No. of Breaks	Max. Work Period	No. of Breaks	Max. Work Period	No. of Breaks
-26° to -28°	-15° to -19°	(Norm breaks) 1		(Norm breaks) 1		75 min.	2	55 min.	3	40 min.	4
-29° to -31°	-20° to -24°	(Norm breaks) 1		75 min.	2	55 min.	3	40 min.	4	30 min.	5
-32° to -34°	-25° to -29°	75 min.	2	55 min.	3	40 min.	4	30 min.	5	Non-emergency work should cease	
-35° to -37°	-30° to -34°	55 min.	3	40 min.	4	30 min.	5	Non-emergency work should cease			
-38° to -39°	-35° to -39°	40 min.	4	30 min.	5	Non-emergency work should cease					
-40° to -42°	-40° to -44°	30 min.	5	Non-emergency work should cease							
-43° & below	-45° & below	Non-emergency work should cease		Non-emergency work should cease							

Training

Workers must be adequately trained. Ensure that the appropriate number of first aiders are on site.

Resources, References, Definitions

The Environment Canada wind chill chart is included below:

Environment Canada Wind Chill Chart

Wind Speed V_{10m} (km/h)	Actual Air Temperature T_{air} (°C)											
	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45	-50
5	4	-2	-7	-13	-19	-24	-30	-36	-41	-47	-53	-58
10	3	-3	-9	-15	-21	-27	-33	-39	-45	-51	-57	-63
15	2	-4	-11	-17	-23	-29	-35	-41	-48	-54	-60	-66
20	1	-5	-12	-18	-24	-30	-37	-43	-49	-56	-62	-68
25	1	-6	-12	-19	-25	-32	-38	-44	-51	-57	-64	-70
30	0	-6	-13	-20	-26	-33	-39	-46	-52	-59	-65	-72
35	0	-7	-14	-20	-27	-33	-40	-47	-53	-60	-66	-73
40	-1	-7	-14	-21	-27	-34	-41	-48	-54	-61	-68	-74
45	-1	-8	-15	-21	-28	-35	-42	-48	-55	-62	-69	-75
50	-1	-8	-15	-22	-29	-35	-42	-49	-56	-63	-69	-76
55	-2	-8	-15	-22	-29	-36	-43	-50	-57	-63	-70	-77
60	-2	-9	-16	-23	-30	-36	-43	-50	-57	-64	-71	-78
65	-2	-9	-16	-23	-30	-37	-44	-51	-58	-65	-72	-79
70	-2	-9	-16	-23	-30	-37	-44	-51	-58	-65	-72	-80
75	-3	-10	-17	-24	-31	-38	-45	-52	-59	-66	-73	-80
80	-3	-10	-17	-24	-31	-38	-45	-52	-60	-67	-74	-81

where
 T_{air} = Actual Air Temperature in °C
 V_{10m} = Wind Speed at 10 metres in km/h (as reported in weather observations)

- Notes:**
- For a given combination of temperature and wind speed, the wind chill index corresponds roughly to the temperature that one would feel in a very light wind. For example, a temperature of -25°C and a wind speed of 20 km/h give a wind chill index of -37. This means that, with a wind of 20 km/h and a temperature of -25°C, one would feel as if it were -37°C in a very light wind.
 - Wind chill does *not* affect objects and does *not* lower the actual temperature. It only describe how a human being would feel in the wind at the ambient temperature.
 - The wind chill index does *not* take into account the effect of sunshine. Bright sunshine may reduce the effect of wind chill (make it feel warmer) by 6 to 10 units.

Frostbite Guide
Low risk of frostbite for most people
Increasing risk of frostbite for most people within 30 minutes of exposure
High risk for most people in 5 to 10 minutes of exposure
High risk for most people in 2 to 5 minutes of exposure
High risk for most people in 2 minutes of exposure or less

CCOHS Fact Sheet on cold temperature conditions:
http://www.ccohs.ca/oshanswers/phys_agents/hot_cold.html

Revision History

Revision	Date	Description of Change	Personnel Involved
REV 0	Feb 2020	New SWP	D Yanchula
Rev 1	Feb 2023	Reviewed – No change	D Yanchula