

SafeFARM

Health and safety information for Alberta farmers

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Working in cold weather

Source: Canadian Centre for Occupational Health and Safety

Many farms are operational year-round, which means workers are exposed to all weather conditions that Alberta has to offer. These temperatures include the hazardous implications of extremely cold temperatures and bone-chilling wind.

A cold environment challenges the worker in three ways: by air temperature measured in degrees Celsius (°C); air movement (wind speed), measured in metres per second (m/s), kilometres per hour (km/h) or miles per hour (mph); and humidity. In order to work safely, these challenges have to be counterbalanced by proper insulation (layered protective clothing), physical activity and controlled exposure to cold (work/rest schedule).

What is wind-chill temperature?

At any temperature, you feel colder as the wind speed increases. The combined effect of cold air and wind speed is expressed as “equivalent chill temperature” (ECT) or simply “wind chill” temperature in degrees Celsius. It is essentially the air temperature that would feel the same on exposed human flesh as the given combination of air temperature and wind speed. It can be used as a general guideline for deciding

clothing requirements and the possible health effects of cold.

In some parts of Canada the term “wind chill factor” is used. This is a measurement of a heat loss rate caused by exposure to wind and it is expressed as the rate of energy loss per unit area of exposed skin per second.

What can be done to help prevent the adverse effects of cold?

For continuous work in temperatures below the freezing point, heated



Workers should dress according to temperature and wind chill factors when working outside in the winter.

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Cold-weather safety tips

- ✳ Plan to take lots of breaks depending on the severity of the weather you are working in. Consider this guide:
 - ✳ One work break per four-hour period for temperatures down to -28°C with up to 8 km/h wind.
 - ✳ Two to three work breaks per four-hour period for temperatures between -29°C and -31°C and wind up to 16 km/h.
 - ✳ Three to four work breaks per four-hour period for temperatures between -32°C and -34°C and wind up to 16 km/h.
 - ✳ Four to five work breaks per four-hour period for temperatures between -35°C and -37°C and wind up to 16 km/h.
 - ✳ Non-emergency work should cease for temperatures lower than -42°C.
- ✳ Keep your body nourished and hydrated during cold weather work. This will increase your body's ability to respond to extreme temperatures and combat fatigue.
- ✳ Monitor for severe winter weather in your area through Environment Canada or one of the many applications available on smart phones and tablets.
- ✳ Stockpile emergency materials. Have a standby electric generator in case of a power outage, and keep a supply of sandbags, a shovel and road salt or ice melt available.
- ✳ Develop an emergency plan for water and feed resources. Obtain emergency supplies of forage and grain, identify emergency resources for water and have a list of suppliers, truckers and people that can help in case of an emergency.

Shift work: getting enough sleep and physical activity

Source: healthyalberta.com

Workers doing physically demanding jobs need to have the balance, energy and strength to work safely.

This article suggests ways to get enough sleep and physical activity to help you feel at your best throughout your busy shift schedule.

Shift work in Canada

About 25 per cent of workers in Canada do rotational shift work. Shift workers don't work from "nine to five" on weekdays. These workers rotate between day and night shifts or may only work nights.

Some people work 12-hour shifts rather than an eight-hour work day. Many people enjoy shift work, as it allows them longer periods of time off to be with their families or to pursue other interests.

For others, shift work is just part of their job. For example, shift workers often do critical work in hospitals, policing, emergency response, farming, and the oil and gas industry (to name a few areas). In these settings, round-the-clock service (24/7) is needed.

In some cases, if life gets out of balance, shift work can affect workers' health and safety.

Sleep and shift work

Most shift workers don't get enough sleep. They often work when other people sleep and sleep when the rest of the world is awake.

The human body has a 24-hour

cycle of wakefulness and sleepiness regulated by an internal clock. This cycle means that we are naturally wakeful in the morning when it gets light and naturally sleepy when it gets dark at night.

When you're tired because you didn't get enough sleep, you may think and move slowly, make more mistakes and have difficulty remembering things. So, getting a good sleep is important for safety and other reasons.

Getting more physical activity and eating right can be a good strategy for getting a better sleep.

The National Sleep Foundation

has lots of helpful

tips for staying alert on the job and for sleeping. Here are some of their suggestions:

- Try to exercise during breaks.
- Talk with co-workers while you work.
- Try to work with a "buddy."
- Take short breaks throughout your shift to use the employee lounge, take a walk, shoot hoops in the parking lot or climb stairs.
- Try to eat three normal meals per day. Eat healthy snacks, avoiding foods that may upset your stomach.
- If you consume caffeine (coffee, tea, soda, energy drinks, gum, mints), do so early in the shift, such as before 3 a.m. for the night worker.
- Don't leave the most tedious or boring tasks to the end of your shift when you will probably feel the most sleepy.



Carbon monoxide at the work site

Source: Alberta Jobs, Skills, Training & Labour

Farm work often consists of many hazards, most of which are quite obvious. However, sometimes farm workers are at risk of dealing with a hazard they can't see or smell. Such is the case with the deadly carbon monoxide. Unless there is a carbon monoxide detector in every building, the only defense is to know the conditions that create this poisonous gas and take measures to eliminate exposure.

Carbon monoxide is a colourless, odourless gas. It is usually formed from the incomplete combustion of fuels such as coal, coke, wood, oil and gasoline. Most of the carbon monoxide released into the atmosphere comes from internal combustion engines.

Carbon monoxide is a flammable gas. Mixtures of 12 to 75 per cent carbon monoxide in air can catch fire

and explode when there is a source of ignition present. Also, when heated to high temperatures, carbon monoxide can react violently with oxidizing agents such as oxygen, ozone, peroxides and chlorine.

Sources of carbon monoxide at the work site

There are many potential sources of carbon monoxide at the work site. These include emissions from:

- internal combustion engines
- kilns
- furnaces and boilers
- welding
- moulding of plastics
- forging, ceramic, petroleum, steel and waste management industries,
- space heaters and improperly adjusted oil or gas burners
- fires and explosions
- cigarette smoking. ■



Ensure there is adequate ventilation for any indoor job where carbon monoxide is being created.

Working in cold weather *continued from page 1*

warming shelters such as sheds, barns or shops should be available. The work should be paced to avoid excessive sweating. If such work is necessary, proper rest periods in a warm area should be allowed and employees should change into dry clothes. New employees should be given enough time to get acclimatized to cold and protective clothing before assuming a full work load.

Equipment Design

For work below the freezing point, metal handles and bars should be covered by thermal insulating material. Also, machines and tools should be designed so that they can be operated without having to remove mittens or gloves.

Emergency Procedures

Procedures for providing first aid and obtaining medical care should be clearly outlined. For each shift, at least one trained person should be assigned the responsibility of attending to emergencies.

Education

Workers and supervisors involved with work in cold environments should be informed about symptoms of adverse effect exposure to cold, proper clothing habits, safe work practices, physical fitness requirements for work in cold, and emergency procedures in case of cold injury. While working in cold, a buddy system should be used. Look out for one another and be alert for the symptoms of hypothermia.

What should I know about dressing for working in the cold?

Protective clothing is needed for work at or below 4°C. Clothing should be selected to suit the temperature, weather conditions, the level and duration of activity, and job design. If the work pace is too fast or if the type and amount of clothing are not properly selected, excessive sweating may occur. The clothing next to the body will become wet and the insulation value of the clothing will decrease dramatically. This increases the risk for cold injuries.

Some points to consider about dressing for work in cold weather:

- Clothing should be worn in multiple layers to provide better protection than a single thick garment.

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Shift work: getting enough sleep and physical activity *continued from page 2*

- Exchange ideas with your colleagues on ways to cope with the problems of shift work.
- It's a good idea to avoid exercising before going to bed, because exercise raises energy and your body temperature. You should exercise at least three hours before sleeping.

Physical activity to feel better, physically and mentally

If you do shift work, you may benefit from physical activity because:

- Physical activity is refreshing and gives you energy.
- Physical activity increases alertness.

So, exercising before work is a good idea. Finding the time to be physically active may be difficult but is worthwhile even if you feel tired already. You may have more energy after you exercise than before!

Taking an active break during your shift can make you less sleepy and help you focus.

Often, we are more likely to be active with someone else or with a group of co-workers. Try getting your co-workers interested in going for a walk during your break rather than heading for the cafeteria.

Working physical activity into your day

The key to regular physical activity is finding something you enjoy and can fit into your day and then making it a part of your life.

In larger towns, fitness centres are now open 24/7 to allow everyone to use them. Sports leagues can be flexible and allow for people to play

late at night or even during the day if enough people are available.

Some companies offer incentives for workers to be more active. For example, they may provide on-site equipment or facilities.



Whether your shift is during the day or night hours, try to stay healthy and alert. This will reduce the risk of injury to you and those around you.

Companies may also offer support (rebates, financial assistance or health spending accounts) for a fitness club membership, swimming pool passes or other physical activities.

Employers are becoming more aware of the link between fitness and productivity and are more open to helping workers exercise at work.

It helps to find a convenient location to be active on the way to or

from work. For example, some people leave early for work so they can stop in at the YMCA, swimming pool or recreation centre. Others stop off on the way home.

Sometimes, employers will help workers to be more active, especially if they see that this will improve their ability to work.

For many people, having a partner or group of friends to be active with can make a big difference to whether they actually do it. There may be someone else who works your shift who would also like to be more active and is open to doing something together.

A fast 30-minute walk outdoors every day is all you need to do to be active enough for health benefits. Walking with friends also allows for a visit.

Finding activities that you can do with your family will benefit all of you and help you spend time together.

Research has shown that wearing a pedometer is a good reminder to be active and that people who use them are more active than non-users.

Pedometers can be bought in drugstores and sports stores in your area.

Shift workers face challenges from living their lives on a different schedule than the rest of the world, but they also have time available to them when others do not.

By using some creativity and determination, it's possible to get enough sleep, eat in a healthy way, and enjoy physical activity in your day if you work on shift. ■

Working in cold weather *continued from page 3*

Having several layers gives you the option to open or remove a layer before you get too warm and start sweating or to add a layer when you take a break.

- The inner layer should provide insulation and be able to “wick” moisture away from the skin to help keep it dry.
- The additional layers of clothing should provide adequate insulation for the weather conditions. They should also be easy to open or remove before you get too warm to prevent excessive sweating during strenuous activity.
- For work in wet conditions, the outer layer of clothing should be waterproof. If the work area cannot be shielded against wind, an easily removable windbreak garment should be used. Under extremely cold conditions, heated protective clothing should be made available if the work cannot be

done on a warmer day.

- Almost 50 per cent of body heat is lost through the head. A wool knit cap, toque or hood can reduce excessive heat loss.
- Clothing should be kept clean since dirt fills air cells in fibres of clothing and destroys its insulating ability.
- Clothing must be dry. Moisture should be kept off clothes by removing snow prior to entering heated shelters. While the worker is resting in a heated area, perspiration should be allowed to escape by opening the neck, waist, sleeves and ankle fasteners or by removing outerwear.
- If fine manual dexterity is not required, gloves should be used below 4°C for light work and below -7°C for moderate work.
- Cotton is not recommended. It tends to get damp or wet quickly, and loses its insulating properties.

Wool and synthetic fibres, on the other hand, do retain heat when wet.

Footwear

Felt-lined, rubber-bottomed, leather-topped boots with removable felt insoles are best suited for heavy work in cold since leather is porous, allowing the boots to “breathe” and let perspiration evaporate. Leather boots can be “waterproofed” with some products that do not block the pores in the leather. However, if work involves standing in water or slush, the waterproof boots must be worn. While these protect the feet from getting wet from cold water in the work environment, they also prevent the perspiration to escape. The insulating materials and socks will become wet more quickly than when wearing leather boots and increase the risk for frostbite. ■

WIND CHILL CHART

		Ambient Temperature (° C)								
		4	-1	-7	-12	-18	-23	-29	-34	-40
Wind km/h	Velocity mph	Equivalent Chill Temperature (° C)								
Calm										
0	0	4	-1	-7	-12	-18	-23	-29	-34	-40
8	5	3	-3	-9	-14	-21	-26	-32	-38	-44
16	10	-2	-9	-16	-23	-30	-35	-43	-50	-57
24	15	-6	-13	-20	-28	-36	-43	-50	-58	-65
32	20	-8	-16	-23	-32	-39	-47	-55	-63	-71
40	25	-9	-18	-26	-34	-42	-51	-59	-67	-76
48	30	-16	-19	-22	-36	-44	-53	-62	-70	-78
56	35	-11	-20	-29	-37	-46	-55	-63	-72	-81
64	40	-12	-21	-29	-38	-47	-56	-65	-73	-82

Adapted from: Threshold Limit Values (TLV™) and Biological Exposure Indices (BEI™) booklet; published by ACGIH, Cincinnati, Ohio

Little danger in less than one hour exposure of dry skin

Maximum danger of false sense of security

DANGER - Exposed flesh freezes within one minute

GREAT DANGER - Flesh may freeze within 30 seconds

Risk management in winter conditions

By Nicole Hornett, ARD Farm Safety Coordinator

How do outdoor workers cope with cold weather? For farmers and ranchers, cold weather or extreme winter weather represents just another day on the job. Sometimes simply adding a layer of clothes just isn't enough.

Let's apply the hierarchy of control to discover some solutions for controlling an outdoor worker's exposure to cold temperatures (a.k.a. "the hazard"). The hierarchy of control is a systematic approach to put the strongest "line of defense" between the hazard and the worker.

Can the hazard be eliminated or substituted?

Probably not: Livestock still need to eat and have their water sources inspected and de-iced. Workers still need to go outside to get to the barns or check the enclosures. Evaluate

the role of non-essential workers or observers (siblings, cousins, friends, etc.) – now is the time to focus on the task at hand, not to socialize.

Which engineered controls could we put into place?

Do you use machinery to haul bales, check water and observe the livestock? Select the most reliable vehicle with a safe, dependable heating source to limit exposure to the cold temperatures. Ensure you and the vehicle are adequately equipped with emergency winter gear and a method of communication. What would you do if your tractor stalled at -40°C and you couldn't get it re-started?

Are there administrative controls that could help?

Do you use a cold weather work/break schedule? It is a great example of an administrative control. It outlines how many warm-up breaks a worker should engage in depending on the air temperature and the speed of the wind (wind-chill value). Scheduling tasks and workers can

help to ensure no one is over-exposed to the hazard. Save non-critical outdoor tasks for warmer days and limit workers to only essential tasks when the temperature or wind-chill values drop. When it's dangerously cold, workers should utilize more frequent check-ins and be trained to detect and act on cold-related first aid emergencies.

Is there personal protective equipment (PPE) we should wear?

In cold weather, PPE is best paired with engineered and administrative controls. Sending an unknowing worker out with only a warm jacket and good mittens is unsafe. Sending that same worker out with the right clothing and the knowledge to make good decisions about working in the cold is a much safer option. Supervisors and workers need to know their exposure limits and have ample opportunities to rest, rehydrate and warm up.

Having a good working knowledge about the challenges that come with working in cold temperatures or extreme winter weather is valuable. Evaluating those challenges and putting a safety plan into action is a great way to ensure everyone works safely through these upcoming winter months. ■



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**“Precaution
is better
than cure.”**

– Edward Coke