

The Safety Factor



— BUREAU OF —
RECLAMATION

Reclamation's Newsletter on Safety and Occupational Health

1st Quarter 2020

Director's Message: The Power of Caring

From Karen Knight, Director of Security, Safety, and Law Enforcement Office, Bureau of Reclamation

In March 2003, a springtime blizzard dumped several feet (yes, feet) of heavy, wet snow in Denver. The snow in my driveway was deeper than my 19-month-old son was tall—somewhere, I have pictures to prove that. The morning after the snow finally stopped, my family and I bundled up and began to clear the snow from our driveway and walkways. As the morning progressed we were joined by several of our neighbors who were also clearing snow from in front of their own homes. It was hard work. Those with snow blowers found the snow too wet to be effectively cleared, and those of us without snow blowers had to shovel, and shovel, and shovel. Now imagine doing this with the help of a 19-month-old.

As a few of us were finishing up the chore, one of my neighbors, who was a firefighter, called us over to his driveway. He told us the story of a similar large blizzard that hit a few years earlier when he was on duty at the fire station. When an emergency call came in, he and his partner escorted the ambulance sent to respond. The home they were trying to get to was on a hilly street similar to ours. The snow was so deep that the residential street was not passable, so they had to call for a snowplow to come and clear a path to the residence. Once they reached the residence, they assessed the situation and determined the person needed to be transported to the hospital. They then had to get the stretcher in and out of the home through several feet of snow. My neighbor spoke of the frustration he and the other responders felt as they shoveled the driveway themselves in order to get the stretcher back to the ambulance. He vowed that night to never allow something like that to happen on his street or to his neighbors.

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Director's Message

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Now that our own driveways were clear, my neighbor chained up his truck and began driving up and down the hill of our street to compact the snow. He assigned the rest of us to start shoveling paths from the street to the doorways of the few neighbors who were unable to do this for themselves. I shoveled a path from the mailbox to the door of the elderly couple across the street from my house. The path I cleared was beautiful, and yet it was only the width of my snow shovel. My neighbor stopped driving to instruct us that a stretcher and ambulance would require a much wider path. So we went back to work.

By the time we were all finished, we had cleared the few remaining driveways on the street and compacted a path wide enough for emergency vehicles to make it up and down the street if needed. Finally, my neighbor was satisfied. He had done everything within his power and rallied the rest of the neighborhood to take responsibility for the safety of our neighbors.

That neighbor has since retired and moved from the neighborhood. But I often think of him and his commitment to the safety of others, especially during heavy snowstorms. Safety is more than a set of rules or wearing your PPE. True safety is caring about the well-being of yourself and others. My neighbor taught our whole neighborhood that lesson that day.

Five Steps for Getting Your Car Out of the Snow

February and March are typically the snowiest months of the year. This winter season seems to be on the same track. So if your car is stuck in the snow, here's five things to do to get it out safely.

1. Clear a path around your tires. Dig snow and ice away from the drive tires (the tires that have power going to them) a few feet in front and behind, so the car can move back and forth. Keep a shovel handy in the trunk for this.
2. Rock your car. Gently switching from drive to reverse helps to dislodge snow from around the tires. Use the brake to keep the car motionless when changing gears. Your car will be grateful for this.
3. Do not floor it. It is tempting to gun the engine when you're trying to get unstuck. Resist that urge—it will actually make things worse. Go easy on the pedal: give the car just a little gas to get the needed rocking motion. Momentum sets you free, not power.
4. Improve traction. Salt, dirt, sand, cat litter—all these can provide some traction when you're stuck. Put several handfuls in the paths you dug around your tires in step one. Add an extra handful both right in front of and behind each tire. Then repeat steps two and three.
5. Finally, get a little push. With your foot easy on the pedal, give the car a little bit of gas while a few people push the car in the direction you want to go. Make sure that those pushing do not put themselves into a hazardous situation while helping you.

Above all, stay calm. Try not to get stressed or frustrated if your car gets stuck. If these steps do not free your snowbound car, get to a safe place and call for roadside assistance.

Safety Spotlight: Avalanche Safety Education

By Allison Cryns, Denver Safety Office

The winter and spring of 2019 saw unprecedented avalanche activity across the state of Colorado. Avalanche management requires Colorado's state and local governments to work together to monitor avalanche conditions and plan avalanche control. But avalanches can be unpredictable and powerful. That's why, as a skier who wanted to get away from the crowds and explore the backcountry, I enrolled in an avalanche education course in March 2019.

Recreational and professional avalanche training is developed for backcountry users in the United States, South America, Asia, and Europe by the American Institute for Avalanche Research and Education (AIARE). The standard recreational AIARE level one course is a three-day seminar that combines classroom and field instruction to introduce students to the hazards of avalanche terrain. Traveling safely in the backcountry requires a solid understanding of avalanche risk and the knowledge to mitigate this risk through terrain assessment and informed decision making. My AIARE-certified instructor showed me and my fellow students how to recognize, manage, and minimize avalanche risk.

Day one, we stayed in the classroom and learned about the specific equipment we would be using and the terrain we would be traveling in the following days. Days two and three, we spent time in both the classroom and the field. In the classroom, we studied avalanche forecasts and local historic avalanche information and planned our trips. In the field, we practiced using beacons, shovels, and probes and digging snow pits. (A snow pit, or snow profile, is a pit dug vertically into the snowpack where snow layering occurs so that stability tests can be performed.) As a group we discussed observations, test results, and conditions that can lead to avalanches.

The timing of the course could not have been better: the first night of our class, a massive natural avalanche broke off Aspen's Highlands Ridge. It was over a mile wide and ran more than 3,000 vertical feet downhill. This allowed us to observe in real time the conditions for and destruction from a massive avalanche. Read the Colorado Avalanche Information Center's report on this particular avalanche at [avalanche.state.co.us/](http://avalanche.state.co.us/caic/obs/obs_report.php?obs_id=55413)

caic/obs/obs_report.php?obs_id=55413.

I recommend taking the time to learn more about avalanche conditions and control, especially if you ski, snowshoe, or snowmobile in the backcountry. Check the following resources and enroll in an avalanche course.

Colorado Avalanche Information Center (CAIC): www.avalanche.state.co.us

American Institute for Avalanche Research and Education (AIARE): www.avtraining.org

Colorado Department of Transportation (CDOT): www.codot.gov/travel/winter-driving/AvControl.html

Did You Know: Three Simple Steps to Take Winter by Storm

In most of the western United States, it's not a matter of if a winter storm will hit, but when. Follow these three simple steps to be ready for the next winter storm:

Step 1: Build a kit

Step 2: Make a plan

Step 3: Stay informed

Read on in this edition of *The Safety Factor* for tips on building a winter travel survival kit. Refer back to the 2nd Quarter 2018 edition of *The Safety Factor* for advice on making a plan. And visit [the website Take Winter by Storm](#) or [the National Weather Service's Winter Safety page](#) for checklists and news that will keep you informed and prepared.

Following these three simple steps will make your winter safer and less stressful!

Controlling Noise in Hydroelectric Power: Part 3 – Shasta Powerplant

By Michael L. Green, Denver Safety Office

Noise-induced hearing loss is Reclamation's number one workers' compensation cost. However, noise-induced hearing loss is preventable. While Reclamation continues to encourage and enforce the use of hearing protection equipment, such as ear plugs and ear muffs, we are also exploring options to reduce noise exposure using engineering controls.

In 2011, the Safety and Occupational Health Office initiated a research and development project to identify primary noise sources and reduce noise levels in Reclamation's powerplants by using engineered noise control materials and methods. This effort continues through a partnership with the Office of Naval Research. In December 2017, engineered noise controls were installed at Shasta Powerplant. The follow-up noise survey conducted in July 2018 showed a reduction of noise levels in the powerplant.



Powerplant Walls



Maintenance Shop

Shasta Powerplant installed acoustic absorption panels on the generator level walls, flexible noise barriers at the maintenance shop on the generator level, acoustic absorption panels in the turbine pits, and flexible noise barriers at scroll case passageways.

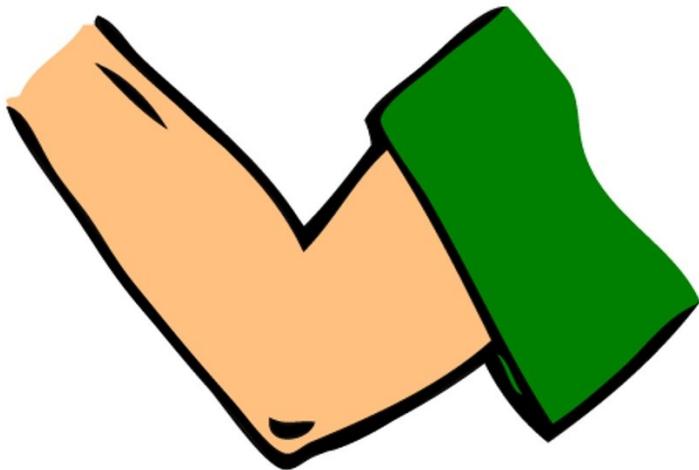
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Cough or Sneeze, Use Your Elbow Please!

In the past decade, public health officials and medical practitioners have been advocating new cough and sneeze etiquette: using the crook of your bent arm—the bend of your elbow—to cover your nose and mouth. Think about that area of your body. You don't typically use it to shake hands or open doors or touch common surfaces. So, the likelihood of transmitting contagions from your inner elbow is significantly less than from your hands.

Even if you use tissues or handkerchiefs, the virulent germs that cause cold and flu can contaminate your hands. And janitorial workers are then exposed to the germs in the tissues you've discarded in waste bins.

Cough or Sneeze,



Use Your Elbow Please!

For more information on safe practices for coughing and sneezing, go to: https://www.cdc.gov/healthywater/hygiene/etiquette/coughing_sneezing.html

Although none of us can completely eliminate the potential for exposing others to these viruses, we can make a big dent in how much ick we spread around by using our elbows to cover our coughs and sneezes.

I Spy with My Working Eyes

By MRutheyi Thompson, Denver Safety Office

Each year I get my annual eye exam. Each year my ophthalmologist congratulates me on having good eyesight, especially for my age. But this past year, even with my prescription reading glasses, I was finding it hard to see clearly when working on my computer at the office.

After a little discussion, my doctor realized that my monitors are out of range for my reading glasses. Reading range is quite close up—two feet or less from your eyes to the focus of your vision. My computer monitors are about an arm's length away, which is considered mid-distance vision. The ocular adjustments our eyes make for mid-distance vision are different from those they make for reading range vision. If you have an astigmatism, as I do, then the adjustments your eyes make for mid-distance vision may be even more pronounced.

Thanks to that conversation with my eye care specialist, I now have a pair of glasses dedicated just to office computer use. It really does make a huge difference to have the right tools for the job. So the next time you are in for your annual eye exam, talk to your eye doctor about the tasks you do at work and the best eye care for your job.

Safety Factor Editorial Corner:

The Importance of Being Prepared

Editorial by MRutheyi Thompson, Denver Safety Office



View from the front porch, as the ice storm rolls in
Photo Credit: Lola Sales

My mom, The Safety Witch (see the 4th quarter 2019 *The Safety Factor*), often reminded us children that it was important to always be prepared. (Yes, she was a Scout leader—Boy and Girl Scouts both.) She was the poster child for preparation. Over the years, time after time, her message proved to be full of wisdom and practicality.

One memory especially comes to mind: A nasty ice storm had rolled through northwestern Arkansas. Most every city in our region was without power, and emergency services were having extreme difficulty handling even the most critical response calls.

My mom, prepared as always, had hung a contractor's tarp from the rafters in the living room and heated that now cozy living area with her gas fireplace. She put a couple of tea kettles on the sides of the fireplace to keep hot water at the ready and to humidify the air. She put the gas grill on the front porch ahead of the storm so she could still cook. She put ice chests on the front porch too, filled with things that would normally have been in the fridge. While not ideal, it was a makeshift living arrangement meant to keep her and my stepfather from freezing and starving.

The ice storm rolled in around late afternoon. The first night was frigid, but in her living room it was bearable. The next morning there was a knock at her door. Carla, one of her neighbors from down the street, was at the door with her two young children. She asked if the offer to “camp indoors” was still available. Of course it was, my mom replied.

One of my mom's other neighbors, Debbie, was a young mother with a week-old infant at home. Her husband was a Washington County deputy sheriff who was on duty when the ice storm hit. As Carla and her children began to warm up in the living room, my mom asked about the deputy sheriff's wife. No one had heard anything—but surely Debbie and her newborn had gone to a relative's house ahead of the storm. My mom, never one to assume, donned all her arctic gear, grabbed her ski poles, and slowly, carefully walked across the icy lawn to the house next door. When she knocked, Debbie answered the door, and in Debbie's arms was her severely cold newborn. My mom sprang into action. First, she got Debbie and the baby to her house. Then, she returned to their house and gathered supplies to care for the newborn. Finally, she made one last treacherous trip back to her own house.

For the next three days these neighbors lived in my mom's living room. They were comfortable enough, warm, well-fed, and even entertained (my mom taught everyone cribbage). When the electricity was finally restored and the families were safely back at their own homes, my mom turned to my step-father and quietly proclaimed, “And *this* is why we keep an arctic survival gear bag, my dear. Finally came in handy, didn't it?” For many winters it had never been needed, but this time, her preparation had saved lives. She knew—and taught—the importance of being prepared.

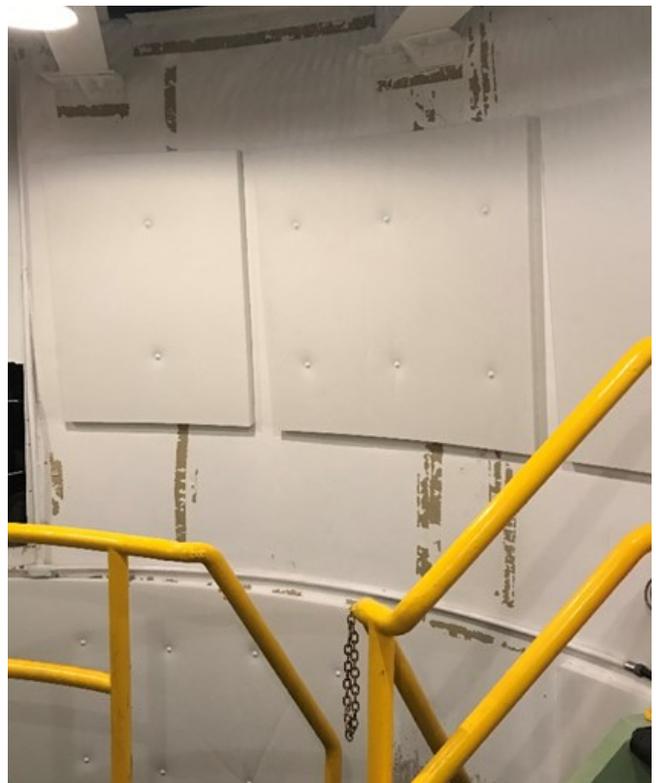
Controlling Noise in Hydroelectric Power: Part 3 (continued)

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Scroll Case Passageway

Data from the follow-up noise survey at Shasta Powerplant indicated the noise level on the generator level decreased about 5 decibels (from 90 decibels before to 85 decibels after). The noise level in the maintenance shop decreased about 6 decibels (from 76 decibels before to 70 decibels after). The noise level in the turbine pits increased about 2 decibels (from 91 decibels before to 93 decibels after). The increased noise level was caused by increased head pressure on the turbine during the follow-up survey. The noise level at the scroll case passageways increased about 5 decibels (from 91 decibels before to 96 decibels after). The increased noise level was caused by increased head pressure on the turbines and increased noise from the jet pumps during the follow-up survey. The generator level of the powerplant is now a quieter and safer work environment; however, additional noise controls would make other areas of the facility a safer work environment.



Turbine Pits

In a future *Safety Factor*, look for Part 4, which will outline the engineered noise controls at another Reclamation powerplant. For more details about the Noise Control Project, please contact Michael L. Green, Safety Engineer, at mlgreen@usbr.gov or 303-445-3725.

All photos taken by Michael L. Green, P.E.

Stranded in a Vehicle in the Snow? Don't Panic!

Even with the best preparation and planning, you could end up stranded in a vehicle in winter weather. What do you do?

- Stay in the vehicle, except when necessary. Getting out will likely put you at greater risk than staying inside.
- Call for emergency assistance, if needed. Otherwise, call roadside assistance or a non-emergency dispatch number.
- If you can, hang a brightly colored cloth on the vehicle's radio antenna or from the top of one of the vehicle's doors. Only raise the hood of the vehicle if the engine is unable to run.
- Make sure the tailpipe is clear of obstruction and remains that way. Run the engine for 10 minutes per hour and use the heater to warm the inside of the vehicle. Open a window that won't bring in exhaust flow an inch or two to keep fresh air circulating and to prevent carbon monoxide buildup.
- Do some mild exercises to keep blood flowing in your extremities. Clapping your hands, marching in place while seated, and doing other small, repetitive motions will help you maintain good blood circulation. Try not to stay in one position for too long.
- Stay awake, but avoid using electronics to pass the time. Those devices will drain the power from the vehicle's battery if plugged in. Reserve cell phone use for important or emergency communications.
- Use newspapers, blankets, extra clothes, and even removable car mats for extra insulation. Put your hands in your armpits or between your legs for added warmth.
- Do not overexert yourself. Overexertion strains the heart and also induces sweating, which will make you more susceptible to hypothermia.



Photo courtesy of AAMCO Colorado

Slip Sliding Away on the Sidewalk

Most cities require snow and ice to be removed from sidewalks within 24 hours of a winter weather event. But even when businesses and homeowners give prompt and good attention to their walkways, slippery conditions can still exist and walking safely takes a little extra thought and effort.

Follow these suggestions to stay safe while walking in the winter:

- Wear appropriate footwear. Shoes should have visible, deep, heavy treads and flat bottoms: no heels or slick soles.
- Walk with slow, conscious steps. Think tortoise instead of hare.
- Use handrails if available. Balance matters.
- Watch where you step. Black ice is clear ice, and ice is not nice to walk on.
- Be aware of more than just what's in front of you. Keep an eye out all around for hazards. Sudden movements on slick surfaces usually end in splats.
- Be aware of what's above you. Snow and ice can fall from eaves of buildings and limbs of trees, adding to treacherous sidewalk conditions.
- Make a safe transition when coming from outdoors to indoors. Floors are often wet just inside building entrances, where snow and ice fall off boots and shoes and melt. Water can create a slippery surface too.

Save yourself a trip to the emergency room by avoiding a slip as you walk through winter snow and ice.

Mittens or Gloves: Which Are Better

A 2016 study conducted in Antarctica and published in the *International Journal of Circumpolar Health* showed that mittens are warmer than gloves.¹ Although not the most fashionable of winter clothing, mittens trap the body heat from all the fingers of your hand, keeping it within the mit and reducing the evaporative heat loss. In frigid temperatures (below 0°F), layering mittens is the best option, as layers dry faster than one heavily insulated glove or mitten.

Sometimes grip is important and you must use gloves. In these cases, choose the best-rated insulated glove and carry a spare pair of mittens in your pocket. Wear the mittens over the gloves when you're not doing work that requires grip.

¹ Kenneth V. Iserson, "Glove and Mitten Protection in Extreme Cold Weather: An Antarctic Study," *International Journal of Circumpolar Health* 75, no. 1 (2016), <https://doi.org/10.3402/ijch.v75.33564>.



Safety Focus: Driving in Snow and Ice

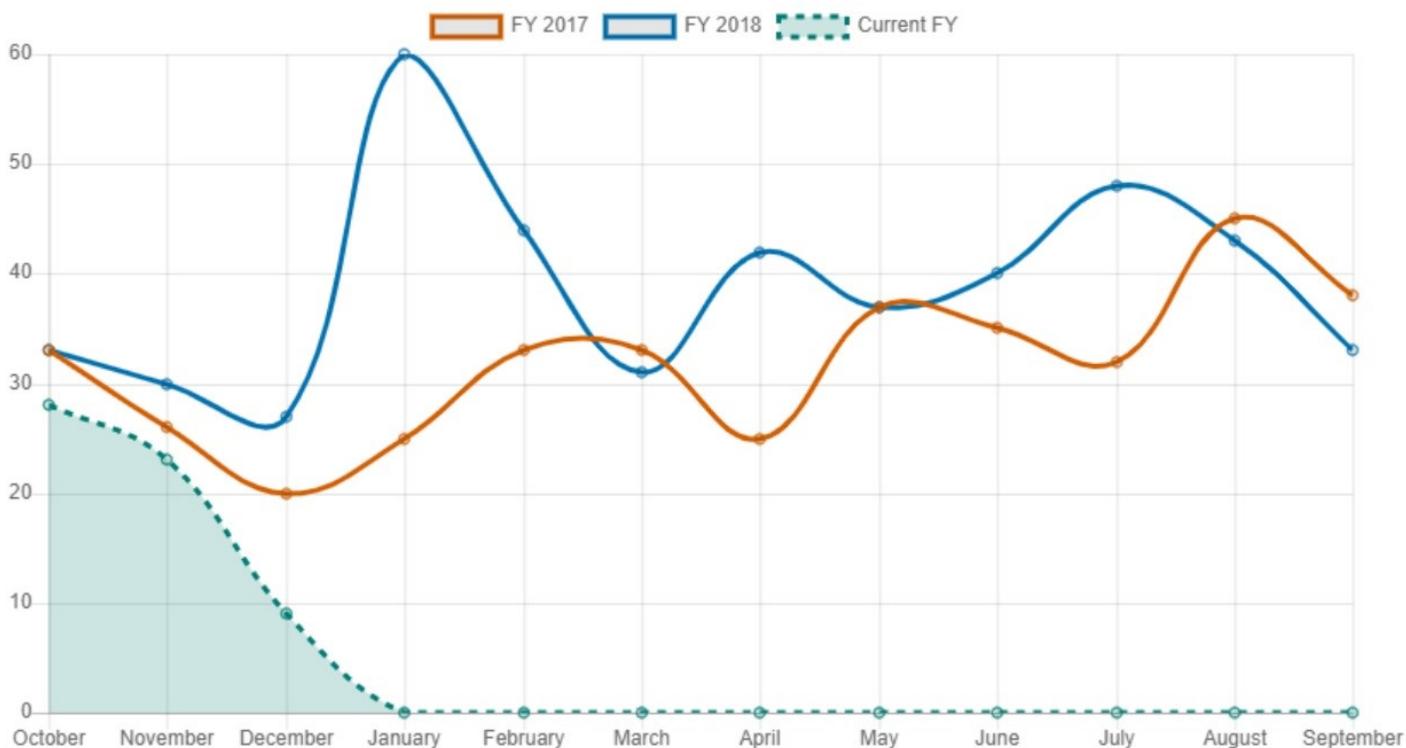
Driving hazards exist all year long, but especially in the first three or four months of the year, when most ice and snow accumulations happen. Knowing how to drive on frozen or snowy roads will help you brave the elements safely and confidently. The National Highway and Transportation Safety Administration offers three Ps for winter driving that begin long before you start down the road.

1. **PREPARE.** Have your vehicle serviced before winter weather hits. Make sure your tires are in good condition, with deep enough tread; switch to snow or studded tires if appropriate for your area. Put a winter survival kit in your trunk. Have a good scraper and long-handled brush in your car so you can remove snow and ice from all windows and side mirrors before you drive—and be sure to clear the lens of your backup camera, if your vehicle is equipped with one. Finally, if traveling outside your normal routes, let someone know your travel plans (see 2nd Quarter Year 2018 *The Safety Factor* articles “Safety Factor Editorial: Safe Driving for All” and “Safety Focus: Travel Plan” for more info on the travel plan).
2. **PRACTICE.** Every vehicle handles differently on snowy, icy and wet roads. Find a safe place to learn how your vehicle handles under adverse weather conditions before getting onto the road with other vehicles.
3. **BE PRUDENT.** If you do not feel comfortable driving in the conditions and you can stay in place, do so. It is better to take a day off, telework, or reschedule an appointment than to put yourself and others at risk by trying to drive in conditions you are not comfortable with. If you must drive in inclement winter weather, use your defensive driving skills and be extra cautious. Leave more following distance than usual and drive at a speed fitting for the conditions and traffic.

For more winter driving tips, go to www.nhtsa.gov/winter-driving-tips.

SMIS Dashboard

All Accidents Reported in SMIS



Winter Travel Survival Kit: It's More Than Junk in the Trunk

Winter driving has many dangers, and being as prepared as possible for those dangers reduces stress when you're facing wintry roads. A great way to be prepared is to have a winter travel survival kit in your vehicle. Here are some of the most useful items to have in your kit:

- Small or folding shovel
- Reflective triangles or road hazard reflectors
- Whistle
- Extra toque or heat-retaining hat
- Water-tight boots (Wellies, snow boots, etc.)
- Jumper cables
- Heavy duty tarp
- Snow brush
- High visibility safety vest, with reflective strips if possible
- Extra set of warm clothing
- Extra mittens
- First aid kit
- Tire chains (required in some states)
- 5-gallon contractor's utility bucket
- Extra windshield wiper fluid
- Safety candle (canned type, rated for small spaces)
- Arctic-rated sleeping bag
- Non-perishable foods
- Sand or cat litter, for traction aid
- Books or crossword puzzles with pencils and pencil sharpener
- Trash bags
- Flashlight, with batteries stored separately
- Matches
- Extra blankets
- Water
- Cell phone battery charger pack and cords
- Solid utility (hunting) knife
- Toilet paper

Some of these items may seem odd or excessive, but they all come in handy when you're stranded in a vehicle in winter driving conditions.

Be sure to routinely check the best by or expiration date on foods and medications in your kit. Don't keep water in your kit when you're not traveling if the temperatures will be below freezing. And if you're traveling with others, include enough items in the kit for them too.

Hopefully you won't have to use your winter travel survival kit, but if you do, you'll be glad you took the time to equip it well and put it in your car. Make it a great trip by making it a safe trip!



5-minute safety talk

Working Safely in Cold Environments

Working outside in the cold for prolonged periods of time is a hazard that can lead to injury and illness if not properly addressed. Stressors include cold temperatures, high winds, dampness and contact with cold water or surfaces. The following environments are especially dangerous: rooftops; open or unheated cabs; steel structures; high buildings open to the elements; and refrigerated areas.

When a construction worker is exposed to cold environments, three significant health problems may result: frostbite, hypothermia and dehydration.

Frostbite:

The most common cold-induced injury. It usually affects the fingers, hands, toes, feet, ears and nose.

Superficial frostbite: Characterized by white, waxy, or grayish-yellow patches on the affected areas. The skin feels cold and numb. The skin's surface is stiff but underlying tissue feels soft and pliable when depressed.

Treat superficial frostbite by moving the victim to a warm, dry area. Remove any constrictive clothing items that could impair circulation. Place dry, sterile gauze between toes and fingers to absorb moisture and to keep them from sticking together. Slightly elevate the affected part.

Seek medical attention as soon as possible. If you are more than one hour from a medical facility and you have warm water, place the frostbitten part in the water (102-106 F or 38.8-41.1° C). If you do not have a thermometer, test the water first to see if it is warm, not hot. Rewarming usually takes 20 to 40 minutes or until tissues soften.

Deep frostbite: Usually affects the feet or hands and is characterized by waxy, pale, solid skin. Blisters may appear. Treat deep frostbite by moving the victim indoors and immediately seek medical attention. Never re-warm a frostbitten body part by rubbing, exposing to open fire, rubbing with snow or cold water soaks. Never allow a re-warmed body part to re-freeze.

Hypothermia:

Occurs when the body's temperature drops below 95 F or 35° C. Symptoms of this condition include a change in mental status, uncontrollable shivering, cool abdomen and a low core body temperature. Severe hypothermia may produce rigid muscles, dark and puffy skin, irregular heart and respiratory rates and unconsciousness.

Treat hypothermia by protecting the victim from further heat loss and calling for immediate medical attention. Move the victim out of the cold and replace wet clothing with dry clothing. Add insulation such as blankets, pillows, towels or newspapers beneath and around the victim. Be sure to cover the victim's head. If alert, provide a warm, sweet drink – avoid caffeine or alcohol.

Handle the victim gently and place in a horizontal (flat) position. Give artificial respiration or CPR (if you are trained) as needed.

Dehydration:

Occurs when the body does not have as much water and fluids as it needs to perform its normal functions. Causes include losing too much fluid, not drinking enough water or fluids or a combination of both. In cold environments,

thirst is often suppressed and dehydration occurs when fluid intake is reduced.

Some symptoms of mild dehydration include weakness, dizziness, fatigue and dry mouth. Treat dehydration by providing the victim with a warm, sweet drink – avoid caffeine or alcohol. In severe cases, seek medical attention.

Safety Precautions: The following are some guidelines to help combat cold-induced hazards:

- Know the signs and symptoms of cold-induced injuries and illnesses. Be aware of proper treatment methods.
- Layer clothing to accommodate for changes in weather. Wear synthetic fabrics close to the skin. If conditions are wet, wear waterproof or water-repellent clothing (wet clothing loses 90 percent of its insulating value). Brush off snow regularly to avoid moisture.
- Drink warm, non-alcoholic, caffeine-free liquids and warm solid foods to maintain fluid levels and preserve body heat
- Use the buddy system – work in pairs to ensure each other's safety
- Seek shelter at regular intervals to rest and warm up. Workers showing any signs or symptoms of overexposure should immediately come out of the cold.
- Use extreme caution if you suffer from a health condition, are taking medication or are in poor physical condition. You may be at increased risk.

Visit [nsc.org/members](https://www.nsc.org/members) for more safety tips

