



An insurance company staged this breakthrough for a water safety film. The car sank within 45 seconds, turned over, and settled on its top.

When is ice safe? There really is no sure answer. In fact, ice is probably never 100 percent safe. You can't judge the strength of ice just by its appearance, age, thickness, temperature or whether or not the ice is covered with snow. Strength is based on all these factors -- plus the depth of water under the ice, size of the water body, water chemistry and currents, the distribution of the load on the ice, and local climatic conditions.

SOME COLD FACTS ABOUT ICE

New ice is usually stronger than old ice. Four inches of clear, newly-formed ice may support one person on foot, while a foot or more of old, partially-thawed ice may not.

Ice seldom freezes uniformly. It may be a foot thick in one location and only an inch or two just a few feet away.

Ice formed over flowing water and currents is often dangerous. This is especially true near streams, bridges and culverts. Also, the ice on outside river bends is usually weaker due to the undermining effects of the faster current.

The insulating effect of snow slows down the freezing process. The extra weight also reduces how much weight the ice sheet can support. Also, ice near shore can be weaker than ice that is farther out.

Booming and cracking ice isn't necessarily dangerous. It only means that the ice is expanding and contracting as the temperature changes.

Schools of fish or flocks of waterfowl can also adversely affect the relative safety of ice. The movement of fish can bring warm water up from the bottom of the lake. In the past, this has opened holes in the ice causing snowmobiles and cars to break through.

ICE TIPS

Think in terms of the thermometer rather than the calendar when deciding to go out on the ice. Just because it was okay on December 1st to go out on the ice last year, doesn't mean it's going to be safe on the same date this year!

Check with a local resort or bait shop about any known danger spots such as aeration systems or traditionally unsafe areas before heading out on the ice.

Have a plan of what to do if you do break through. Carry rope, ice picks and a flotation device to help save your life or that of a companion. During the winter of 2000, an ATV operator who broke through thin ice used a pair of ice picks to save his own life. A vest-style life jacket can provide extra warmth and flotation in case you fall through.

DRIVING ON ICE?

Don't drive on the ice if you can possibly avoid it. If you must, follow these common sense tips:

Stay off the ice at night, especially during a snowfall. If that's unavoidable, be very cautious and drive slowly since holes can open up very quickly. If you drive too fast you might not be able to stop in time.



Two short lengths of broom handle with nails sharpened on both ends and joined with a piece of strong line can be carried easily in your pocket. In case of emergency, and while kicking, drive the nails into the ice and pull yourself to safety.

Be prepared to bail out in a hurry! Some ice safety experts recommend that you have your seat belt unfastened and a window rolled down or door slightly ajar to speed escape. Don't wear a life vest while riding inside a car or truck. The extra bulk could hamper your escape through a window.

Don't go back into a partially submerged vehicle to retrieve equipment.

BE A SURVIVOR!

Let's say you have taken all the precautions and you're going to try your luck at ice fishing. As you walk out on the ice, you hear a crack and fall through. Suddenly you find yourself immersed in water so cold it literally takes your breath away. And the pain is incredible!

What should you do? First, try not to panic. This may be easier said than done, unless you have worked out a survival plan in advance.

1. Don't remove your winter clothing. Heavy clothes won't drag you down, but instead can trap air to provide warmth and flotation. This is especially true with a snowmobile suit.

2. Turn toward the direction you came. That's probably the strongest ice.

3. Place your hands and arms on the unbroken surface. This is where a pair of nails, sharpened screwdrivers or ice picks come in handy in providing the extra traction you need to pull yourself up onto the ice.

4. Kick your feet and dig in your ice picks to work your way back onto the solid ice. If your clothes have trapped a lot of water, you may have to lift yourself partially out of the water on your elbows to let the water drain before starting forward.

5. Lie flat on the ice once you are out and roll away from the hole to keep your weight spread out. This may help prevent you from breaking through again.

6. Get to a warm, dry, sheltered area and re-warm yourself immediately. In moderate to severe cases of cold water hypothermia, you must seek medical attention. Cold blood trapped in your extremities can come rushing back to your heart after you begin to re-warm. The shock of the chilled blood may cause ventricular fibrillation leading to a heart attack and death!

What if someone else falls through and you are the only one around to help? First, call 911 for help. There is a good chance someone near you may be carrying a cell phone. Resist the urge to

General Ice Thickness Guidelines

For New, Clear Ice Only

2" or less - STAY OFF

4" - Ice fishing or other activities on foot

5" - Snowmobile or ATV

8" - 12" - Car or small pickup

12" - 15" - Medium truck



Many items found on shore or in your car, such as jumper cables, a garden hose, some branches, or skis, can be thrown or extended to the victim.

run up to the edge of the hole. This would most likely result in two victims in the water. Also, do not risk your life to attempt to save a pet or other animal.

There is a saying that will help you remember how to perform a water or ice rescue; "Preach, Reach, Throw, Row, Go."

PREACH - Shout to the victim to encourage them to fight to survive and reassure them that help is on the way.

REACH - If you can safely reach the victim from shore, extend an object such as a rope, ladder, or jumper cables to the victim. If the person starts to pull you in, release your grip on the object and start over.

THROW - Toss one end of a rope or something that will float to the victim. Have them tie the rope around themselves before they are too weakened by the cold to grasp it.

ROW - Find a light boat to push across the ice ahead of you. Push it to the edge of the hole, get into the boat and pull the victim in over the bow. It's not a bad idea to attach some rope to the boat, so others can help pull you and the victim to safety.

GO - A non-professional shouldn't go out on the ice to perform a rescue unless all other basic rescue techniques have been ruled out. Extend an object the victim can grasp. If they start to pull you in, release the object and start over.

If the situation is too dangerous for you to perform the rescue, call 911 for help and keep reassuring the victim that help is on the way and urge them to fight to survive. Heroics by well-meaning but untrained rescuers sometimes result in two deaths.

VEHICLE ESCAPE

If your car or truck plunges through the ice, the best time to escape is before it sinks, not after. It will stay afloat a few seconds to several minutes depending on the airtightness of the vehicle. While the car is still afloat, the best escape hatches are the side windows since the doors may be held shut by the water pressure. If the windows are blocked, try to push the windshield or rear window out with your feet or shoulder.

A vehicle with its engine in the front will sink at a steep angle and may land on its roof if the water is 15 feet or deeper.

As the car starts its final plunge to the bottom, water rapidly displaces the remaining air. An air bubble can stay in a submerged vehicle, but it is



A plastic bottle can be loaded with 50' - 70' of nylon rope, and kept ready on your snowmobile. To use, secure the free end of the line and throw the bottle to the victim.

unlikely that it would remain by the time the car hits the bottom.

When the car is completely filled, the doors may be a little easier to open unless they are blocked by mud and silt. Remember too, chances are that the car will be upside-down at this point! Add darkness and near freezing water, and your chances of escape have greatly diminished. This underscores the necessity of getting out of the car before it starts to sink!

YOUR FINAL ANSWER?

Remember, common sense is your greatest ally in preventing ice accidents. Five minutes of checking ice from shore, and systematic checks while on the ice can mean the difference between an enjoyable outdoor experience and a tragedy.

Written by **Tim Smalley** and **Kim Elverum**. Original design, layout and photography by **Tim Smalley**. Additional design and layout by **Sharon Ketelsen, Tom Borchardt, Steve Hallin, Dave** and **Marcia Marquardt** also provided valuable assistance in the production of this pamphlet.

Front cover: Sign erected near many aeration systems, culverts, and other thin ice areas. Diamond shape signifies danger.



Boat and Water Safety
Minnesota Department of
Natural Resources
500 Lafayette Road
St. Paul, MN 55155 - 4046

For more information, call:

(Metro Area) (651) 259-5400 (MN Toll Free) 1-888-646-6367
Telecommunication Device for the Deaf
(Metro Area) (651) 296-5484 (MN Toll Free) 1-800-657-3929
e-mail: boatandwater.dnr@state.mn.us

www.mndnr.gov/boatingsafety

This document is available in alternative formats to individuals with disabilities by calling the phone numbers above.

Equal opportunity to participate in and benefit from programs of the Minnesota Department of Natural Resources is available to all individuals regardless of race, color, creed, religion, national origin, sex, marital status, public assistance status, age, sexual orientation, disability or activity on behalf of a local human rights commission. Discrimination inquiries should be sent to Minnesota Department of Natural Resources, 500 Lafayette Road, St. Paul, MN 55155 - 4049.

Printed on recycled paper containing a minimum of 30% post-consumer waste.
© Copyright 2010, State of Minnesota, Department of Natural Resources 5/10-5M

DTI

DANGER!



Recommended Minimum Ice Thickness

(Rough Guidelines for New Clear Ice Only)

2" or less
**STAY
OFF!!**



4 Inches
Ice Fishing



5 Inches
Snowmobile
or ATV



8-12 Inches
Car or
Small Pickup



12-15 Inches
Medium Truck



Department of Natural Resources



- * Many ice drownings involve children. When your child is near the ice, you should be near your child.
- * Avoid alcoholic beverages when you're on the ice. They can make you feel colder and slow down your reaction time in case of an ice emergency.
- * Carry two large nails to use as ice picks to pull yourself out if you fall through thin ice.
- * Never drive on the ice at night.
- * Avoid pressure ridges, and areas with current if you do choose to drive on the ice.
- * Drive with your windows down and doors partially open to avoid becoming trapped if your car breaks through.

Minnesota Department of Natural Resources
Boat & Water Safety Section

500 Lafayette Road

St. Paul, MN 55155-4046

(651) 259-5400 or call MN toll free 1-888-MINNDNR

Telecommunications Device for the Deaf

(651) 296-5484 or MN toll free 1-800-657-3929

www.mndnr.gov/safety/ice

This document is available in alternative formats to individuals with disabilities by calling the phone numbers above.

*Printed on recycled paper containing a minimum of 25% post-consumer waste.
Copyright 2010, State of Minnesota, Department of Natural Resources*

ISC