Ice Rescue

Know the Ice

Ice Formation:

Cold air cools surface of the water. As the surface water cools it becomes more dense and sinks—being replaced by the less dense and warmer water. This thermal inversion continues until the water is a consistent 39 degrees. At this point the water no longer becomes dense as it gets colder. The cold air continues to cool the water surface until the temperature is sufficient to create ice. Ice expands 9% as it is converted from water. It is therefore less dense and floats.

Types of Ice:

- **Frazil** - thin layers of new ice in disc shapes—very weak.
- **Clear Ice** - New, Strong Ice
- **Snow Ice** - Formed from refrozen snow, murky, porous--weak
- **Layer Ice** - Layers of snow and other forms of ice, refrozen—weak
- **Anchor Ice** - Form on very cold river bottoms and then releases with the warmth of the sun.
- **Pack Ice** - Broken pieces of Ice, blown together and frozen in place. Will have holes and weak spots.

Ice Strength:

Thickness is only one factor in judging the strength of Ice. The formula for calculating the strength of Clear Ice is: Strength = 50 x thickness squared. (S = 50Tsq.) or 2" will support 200 lbs, 4" will support 800 lbs. Remember that Ice will be thickest near to shore. If you measure 3" at shore, count on losing at least an inch of ice as you move to deeper water.

Other factors affecting ice:

- **Snow on Ice** - can insulate Ice from the cold air. Warmer water below the ice may help it deteriorate.
- **Water fowl** - will stir the water and prevent it from freezing. A section kept open by birds may be much thinner even when frozen.
- **Stumps or wood protruding** through the water. The process of decay can produce heat and lessen the strength of Ice.
- **Streams** entering still water or **underwater springs** producing upwellings can produce weak spots.
- **Slush** or water on Ice can cause Ice to weaken.
- **Depth** will result in ice formation taking longer.
- **Water Chemistry** - Golf ponds with chemicals may freeze at different temperatures.

In Rescue Operations always remember:

Someone else has already fallen through, so **the ice is too weak to support you!**

Know the Victim

The main thing you need to know is whether the victim can help to save him/herself. Hypothermia is the lowering of the body temperature. As the temperature drops below 95 degrees the victim loses the ability to help him/herself.

If the victim is dressed well in layers with air trapped between the clothing and has considerable fat and muscle mass - they will have a much better chance of staying coherent and being able to help you. Look and listen for active waving, yelling, complaining and trying to climb out as signs that the victim is still able to assist with his/her own rescue.

If the victim is thin, has no hat, poorly dressed, and has been in the water for a longer period - then, there is a much reduced chance that they will be able to assist in their rescue. Look for signs of lethargy, moaning, and stillness. This is a person barely hanging on and a good bump may will knock them from their grasp of the ice and into the water. This person will not be able to assist you.

Ice is frozen water…..it is cold.….the victim is going to be cold and most likely will be unable to assist.

Know the Equipment & Techniques

As with all Water Rescues, the theory is to **REACH, THROW, ROW and GO.**

Reach:

Equipment:

- Pole
- Stick
- Ladder
- Inflated Fire Hose
- Anything else you can find to help the victim

Technique:

- The Victim Must be able to assist by grasping or attaching the reaching object to himself.
- Make sure to approach the victim from the side - to prevent knocking the victim from his handhold.
- It takes a great deal of effort to pull someone from the water up onto the ice, make sure the object used is sturdy.
- Use REACH in combination with other forms of rescue. Go a safe distance and then reach out to the victim to stay away from the weak ice.

Throw:

Equipment:

- Rope
- Personal Floatation Device
- Floatation Collar/Sling
- Line Gun
- Shirt, pants, or any other device that will allow you to pull the victim from the water.

Technique: (There are two different methods with THROW)

- Using ropes or lines anchored at shore allow the victim to be pulled from the water. The victim will have to hold tight and help elevate himself to the ice. He should then stay low and slide away from the dangerous area. Throw or shoot the line over the victims shoulder - If possible provide a loop for the victim to place under arms. Use a rescue sling if at all available.

- You may also throw the victim a floatation device to keep him afloat until a rescue can be made. A PFD, life-ring, or innertube may allow the victim to have a better chance of staying afloat until an actual rescue can be made.

Row / Blow:

Equipment:

- Boat
- Paddles
- Protective gear
- Airboat

Technique:

- Be prepared to get wet - wear protective clothing and a PFD
- Manually powered boats may require that you break the ice or slide the craft over it. Have adequate tools and expect long delays if you have to break ice.
- Airboats can maneuver between water and ice with little effort.
- Approach victim from the back to prevent knocking them loose from their handhold.
- Grab the victim firmly under the arms and keep your body position low. On the count of three pull the victim in and sit back on the floor of the boat at the same time.
- Be prepared to immediately insulate the victim with blankets.

Go:

Due to the nature of Ice Rescue - the victim is often unable to help himself due to hypothermia, a boat or other equipment to perform the rescue from shore - GO may be the selected option.

Equipment:

- Shore line
- Carabineers
- Wet, dry or rescue suit
- Helmet
- Fins
- Crampons
- Ice awls
- Gloves
- Rescue sleigh or ladder

Technique:

- Don protective gear and attach shore line to rescue and to shore anchor
- Add a carabineer about 6' to 8' from the end of the rope nearest the rescuer
- Don fins and utilize something to disperse weight on the ice
- Talk to the victim, ease on the ice toward the victim
- When close, lay down and slide or role toward the victim from one side
- Try assist the victim out if possible without entering
- Enter water from beside the victim and approach from behind.
- With extra carabineer on rope in hand, reach around the victim and latch on to the rope heading to shore.
- Give the sign to haul the victim up—and assist by pushing the victim onto the ice
- Once out, continue to haul from shore slowly and the rescuer will also be removed from the ice
- Remain low on the ice and move to shore
- Keep others from running on the ice to help, get the patient to EMS, make sure that wet clothes are removed, they are dried and layers of warm clothes are used to passively re-warm the patient.
- Mark area with sign for DANGEROUS ICE before leaving.

Develop a Plan

Evaluate the Victim - can they help with their extrication from the Ice:

- **YES** - Reach or Throw is possible - can wait for help
- **No** - Row/ Blow or Go is necessary - needs immediate assistance

Evaluate the Ice for supporting rescue:

- **YES** - May get closer to victim to try reach or throw
- **No** - May have to work from shore, boat or get wet

Evaluate Equipment and Conditions:

- Personnel
- Safety Gear—suits, helmets, gloves, ice awls, fins
- Boat
- Rope
- Ladder - or Ice Sled to disperse weight
- Determine the closest approach from shore
- Is there an open water lane for a row boat?
- Is there a rescue team close by?
- How deep is the water?

Create a plan and a back-up plan. Have personnel assigned to perform tasks and to be ready to assist for additional problems. Deploy multiple plans - for example THROW while GO team is being suited up and deploy ROW team from different angle at the same time.