SHELTER DESIGN: COVERED SNOW TRENCH

CONSTRUCTION: EASY Single person, One hour or less.
EQUIPMENT: Shovel
SEASON: Winter

The Snow Trench shelter is one of the simplest and quickest shelters that can be made in winter season. This is an ideal shelter for emergency situations as all that is required is a trench that is deep enough for you to lie in. For further protection from wind, blowing snow or for an overnight stay, a roof can be built over the trench.

TYPES OF SNOW TRENCH SHELTERS

The Snow Trench is a simple design in which many different materials can be used. The most common construction methods are shown below:

- **Tarpaulin Trench**: Uses plastic tarpaulin sheeting for the interior and roof. This is an ideal design for a single person.
- **Natural Snow Trench**: Uses material from the environment for the interior and roof. In this design, the materials for the roof are the main difference.

**Single/Multi-person shelter**: If the shelter is for more than one person, then the roof will need reinforcing as the trench will be wider. If this is the case, then lay spars across the trench and cover with tarpaulin or natural materials.

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TARP AULL IN SNOW TRENCH

- Dig trench in the snow
- Line trench with tarpaulin sheet
- Create roof with Tarpaulin sheet
- Finished shelter

NATURAL SNOW TRENCH

- Dig trench in the snow
- Line trench sides with tree boughs
- Create flat roof with tree boughs, spars or ski poles
- Finish roof with tree boughs
- Finished shelter

NATURAL SNOW TRENCH

- Dig trench in the snow
- Line trench sides with tree boughs
- Make snow blocks for the roof. Cut and shape them to fit together
- Finished shelter
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KEY REQUIREMENTS FOR BUILDING A SNOW TRENCH
There are several key requirements for building a Snow Trench.

REQUIREMENT #1: Pick a suitable site: A Snow Trench shelter can be built anywhere; however, the best sites should be in flat sheltered areas with 3 to 4ft snow. If there is no deep snow, then pile snow up to build the walls of the shelter. Avoid areas where there are trees or large rock outcrops as wind may cause snow to swirl and build up on the roof of your shelter.

REQUIREMENT #2: How many people: Before you start, decide how many people are going to sleep in your Snow Trench. The more people, the wider your shelter has to be. With the increase in width, there is a corresponding amount of work and energy required to build to construct the roof. Consider building your Snow Trench for a maximum of 2 or 3 people.

REQUIREMENT #3: Judge when to add your bedding: As this design is trench shaped and below the surface of the snow; getting into the shelter and then into your sleeping bag can be tricky. Consider laying your sleeping bag inside the trench before you build the roof. If you are using tarpaulin for the roof, you can create the roof quite quickly without knocking snow to land on your bedding. If you are building a roof made of snow blocks or spars and tree boughs, you may want to consider adding your bedding after the trench is built.

KEY STEPS FOR BUILDING A SNOW TRENCH
There are several key steps that must be followed when building a Snow Trench. These are described below:

STEP #1: Entrance: Identify the direction in which the wind is blowing. Though your shelter will be beneath the surface of the snow, the entrance should not face the wind.

STEP #2: Digging implement: Everyone who builds a Snow Trench should have a means to dig out snow. The more people and shovels you have, the quicker your shelter will be built. In an emergency situation, your hands are an adequate digging tool if you don’t have a shovel. However, your gloves will get wet so you should change them as soon as you have completed your emergency shelter.

STEP #3: Adequate snow depth: A Snow Trench shelter ideally requires at 2 to 4 feet of snow.

NOTE: It is important to dig the trench deep enough so that you can roll over. This reduces claustrophobia and allows you to roll over without touching the roof of your shelter.
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If the snow is not deep enough, dig to within a few inches of the ground and then pile snow up to build the walls of the trench.

STEP #4: Length and Width: You need to decide whether your trench will be for yourself or for multiple people. A maximum of two people is recommended as the roof of the trench shelter may become too wide to sustain the weight of blowing snow.

You must size your shelter correctly as it will be too late to adjust the size when you get inside with your sleeping bag.

TRENCH WIDTH:
Dig the trench to a width that is just wider that your shoulders when you are in a sleeping bag. This width allows movement and reduces claustrophobia.

TRENCH LENGTH:
SINGLE PERSON TRENCH: Dig the trench long enough to give your space above your head plus a few inches below your feet so that you do not touch the back of the shelter.

Add a slope for the entrance to allow you to slip inside the shelter. This design provides minimal space which allows the shelter to quickly heat up once you are inside.

Use a backpack to seal the entrance to the shelter.

MULTIPLE PERSON TRENCH: Dig the trench to a length that is a minimum of 12 inches longer than your height. Add an entrance channel on one side of the shelter. Ensure that the entrance channel is at least 2 to 3ft long to allow easy access to the interior of the trench. Once inside, the entrance can be blocked by a backpack.
STEP #5: Test the size: After you have dug the trench, you must lay in it to determine if the length and width are sufficient. If you do not do this and go straight to the roof construction, you then incur the risk of
- Building a shelter that is too small for your body with a sleeping bag,
- Damaging the roof of the shelter as you enter it
- Claustrophobia

STEP #6: BEDDING: After the trench has been built, you need to add your bedding before you construct the roof. Do not lie on bare snow as it will drain your body heat very quickly. You will need insulation from the snow. This could be an air mattress, debris or cardboard sheets. If you use debris, make it thick enough to cover the area you plan to lay on. Choose material that you would like to sleep on.

STEP #7: Robust Roof Design: All trench shelter designs require a sturdy roof for protection against the environment. This is an essential requirement as drifting snow may be blown across the top of the shelter and it must withstand the weight of added snow. The roof can be made from a tarpaulin, blocks of snow or boughs of coniferous trees. However, the width of your shelter will dictate the type of roof that should be used.

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<tr>
<th>Shelter Design</th>
<th>Shelter roof design</th>
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<td>Individual snow trench</td>
<td>Tarpaulin / Spars / Snow</td>
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<td>Two person snow trench</td>
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<td><img src="image3.png" alt="Diagram" /></td>
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TARPAULIN ROOF: A tarpaulin roof is secured as follows:

- Dig grooves around the trench
- Place plastic tarpaulin inside shelter and tuck into the grooves
- Shovel snow over tarpaulin to lock it into the grooves. Ensure the tarpaulin is not stretched
- Dig more snow around the trench
- Lay another tarpaulin over the top and tuck the edges around
- Shovel snow over tarpaulin to lock it into place. Ensure the tarpaulin is as taught and flat as best you can.
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ROOF WITH SPARS
Cut wooden spars and lay them across the shelter. Ensure that the spars extend at least 6 inches past the edges of the shelter. Lay enough spars across your roof to ensure that the roof is robust and can support either a tarpaulin sheet or tree bough. If you use tree boughs, consider laying more spars over the top of the boughs as a means to hold them down in the event of a snow storm.

ROOF WITH SNOW BLOCKS
Create snow blocks to make the roof of your shelter. Do not make them long enough to fit flat across the top of your shelter as they will not be strong enough unless you make them very thick. Cut snow blocks such that you can shape them to make a cathedral affect (pointed roof). Cut enough snow blocks to build your roof. Cutting large blocks is the most effective method as you have fewer blocks to fit together.

Start at the rear of the shelter fit and then work towards the entrance of the shelter. This allows you to clean out any loose snow from the shelter as you progress. Try to fit the roof blocks together as best as you can, but not worry if you have small gaps between the blocks.

Once the roof is complete pack loose snow into all the small gaps to seal the roof. Make sure that snow is packed around the edges of the blocks and at the rear of the shelter.
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ENTERING YOUR SHELTER
Once your snow trench is built, you should test it out to determine if you can easily enter it without damaging the entrance and the roof. If the entrance is too small then widen it so that you can enter with ease.

Stand before your shelter, sit at the entrance and then slide in feet first, sliding into your sleeping bag as you enter. This can be quite tricky at first; however it will generate warmth and make you feel quite secure once you are inside the shelter.

ALTERNATE SNOW TRENCH ROOF DESIGN
An alternate design for the snow trench 'snow block' roof is to place two sticks at each end of the trench and then secure string between them. A tarpaulin can then be placed over the string and then secured in place. This design is faster than cutting snow blocks and shaping them to fit.

This alternate design allows for a larger entrance and also provides flexibility for trench shelters when there is insufficient depth of snow.
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KEY TIPS

- **TIME**: When using tarpaulin this shelter can be built in under an hour. When using spars and tree boughs it will take longer. Do not build this shelter late in the day.

- **ENTRANCE**: Build the entrance facing away from the wind. Block the entrance with your backpack once you are inside.

- **DRIFTING SNOW**: Build your snow shelter on flat ground and in areas where snow cannot drift and pile up. The roof of your snow trench shelter may not be strong enough to support the extra weight from drifting snow.

- **SIZE**: Smaller is better. The less space in your trench shelter, the warmer it will be due to your breath and body heat.

- **HYDRATION**: The act of building a snow shelter consumes energy and requires effort which is likely to make you sweat. In winter, sweat will freeze and you are at risk of hypothermia. If you are not in an emergency situation, take frequent breaks, drink water to remain hydrated and try not to overheat and sweat. If you are in an emergency, complete the shelter, climb in and then change into dry clothes as soon as you can - this can be tricky as there may not be much room in your shelter.

ADVANTAGES

- Simple shelter to build as it requires excavation rather than construction
- All round protection from the weather
- Robust design provides excellent shelter
- Shelter can last several days
- Fastest winter shelter to build
- Warms up very quickly due to body heat and breath

DISADVANTAGES

- This kind of shelter is best for overnight sleeping rather than rest during the day
- Shelter can be viewed as claustrophobic
- Roof of shelter can be damaged if the entrance is not sized correctly
- Roof design must be very robust in the event of drifting snow or snow fall