

## MAKING SNOWSHOES

By Oliver Cameron  
with Ole Wik

In the mountains of Idaho, an older friend of mine once told me of making snowshoes 6-1/2 or 7' long. The snow up there was powdery, and in the timber there is no wind to settle it down.

He told me about one time he and his wife were going to go in to a trapline cabin. They were afraid the snow was getting to be too deep, and they wanted to shovel the snow off the roof. They were in their fifties at the time.

A younger neighbor of theirs, who was in his early twenties, wanted to go with them. He had a brand new pair of commercially-made snowshoes. Alfred tried to discourage him, saying "You are going to have a hard time on our trail." But he tried it anyway, and had to give up after a quarter of a mile because he was sinking so deep in the track that Alfred left.

Ordinarily I snowshoe a trail the day before I'm going to use it. Usually I make a camp at the end of the trail that I made the day before. That way it has a chance to set up even better for the return trip.

If I'm going on a fairly long trip, I'll make a trail out a ways and come back. The next morning I'll take the dogs out to the end of that trail, tie them up, break another length of trail, come back, leave that until the next day, and so on.

I go along in short enough steps that I'm not leaving a bunch of soft snow between strides. Coming back, I step on new snow with one snowshoe, but overlap one side of the outbound track with the other. The sled I'm using would fall in a track that was the width of the two snowshoes, because the runners are purposely spaced only 14" apart, but I want to pack the center of the trail a second time to make it a little tighter.

I do that because I hitch my dogs in single file, and I want to make a better trail in the middle for them. The sled itself can ride on the outside. With the snow packed down a little wider, it supports you better, acting as a surface that isn't so tippy. It also gives you a little more maneuverability around short bends by preventing the runner on the inside of the turn from sinking in so much.

**What was the longest such trail you ever made?<sup>1</sup>**

About five miles or so, maybe a little more. I had some meat down by another lake. It took me just two days of this kind of trail making.

A lot depends on the snow conditions. If you've got an extra 18" of new snow on top of what's already there, it's going to take a lot more work. In some cases, when you step

down with your snowshoe, you can throw your weight ahead onto the new snow and give it a bit more compaction. That's quite a bit of work. After a while it gets to be tiring.

After repeated snowfalls, there will be a wall of packed snow in the middle of the trail. That's the reason for making the trail a little wider to begin with. Once in a while your sled will tip on its side at the edge of the trail. If there is a lot of snow, your leader has got to be able to find the hard part, and stay on it. A good leader will do that.

### **Frame**

I have a unique way of making my snowshoes. Ordinary birch-frame snowshoes tend to straighten out, especially on wetting and drying, so I bend some birch saplings while they're still living.

In the spring, after the sap is up, I make some bending boards, 16 to 18" long and 5 or 6" wide. I put two blocks along one edge of the board, at the ends, and another block maybe halfway down the opposite edge.

Then I go out and find suitable saplings to bend for the frame. It's good to find a place where there is a profusion of them, all of the same size. If not, you have to get them here and there.

I cut the branches off where the stem is of a size for the frame of a snowshoe—maybe 3/4" in diameter. I bend the sapling, hook it under one of the cleats at the end of the board, bend it around the cleat that is midway along the opposite edge, and then bend it under the cleat at the other end of the board.

I have holes in a couple of places along the board so that I can tie the sapling in place. That way I can leave it through the summer, and the wind won't blow it off.

In the fall, when the sap has quit running, I go back. By that time the sapling has been growing in the frame for a couple of months, and has taken on the bend. I untie it, cut it off near the ground, and cut the top off.

That gives me the rail for one side of one snowshoe. The thin end of the sapling will go forward. If you're going to have extra weight, you want it behind. That way the front end of the snowshoe will tend to tip up when you lift your foot to take the next step.

The rail will have an upward bend at one end, more than you would want your snowshoes to rise, but the curve at the front of a snowshoe goes both up and also inward toward the center. You are laying that curve over at an angle, so the upward bend is neutralized a bit as it goes inward toward the tip of your snowshoe. If you bend a piece of wire in a curve and lay it down so it slopes up and then tip it over, you'll see what I'm talking about.

When I get home I peel the rails, tie them in a frame, and let them dry. Since they're green, I put in a little extra bend while they're drying.

To make that frame, I get two blocks of wood that are about 8" long, and a couple of sticks that are 4' long or so. I nail a stick on each side of one of the blocks in such a way that the sticks extend maybe four inches past the block, and then fasten a crosspiece to the sticks, right at the ends. I stick the point of the snowshoe member under that stick and around the block of wood, and then tie it to additional crosspieces I've attached to the sticks on the back.

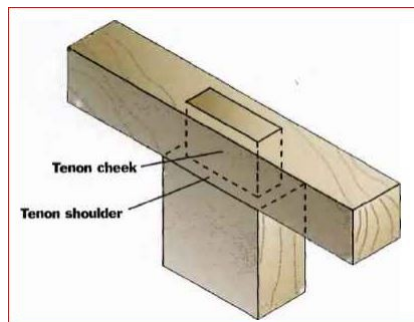
Once the wood has dried, I cut the rails to length. Snowshoes are usually longer than the stride of the person who is using them. Commercial trail snowshoes are 10" wide and maybe 4' long, or a little more—56" comes to mind. I make mine quite narrow and considerably longer than that, depending on how I am going to use them. If I'm going to be breaking trail through deep fluffy snow, I make them 5-1/2 or 6' long.

When you're going through thick stuff, it's nice to have something narrow that will slide in between things. So instead of overlapping the two sides to make a typical rounded snowshoe front, I tie the front ends of the rails into notches in a block of wood that forms kind of a Y at the front end of the frame. It has a rounded bottom that curves up a little bit, and also adds a little turn-up on the front. That is the simplest way to make the front of a snowshoe.



Handmade snowshoe tips.  
Image: Rein or Dyre Dammann

Roughly halfway back from the front I put in a crosspiece 3/8" thick, using a mortise and tenon joint. You put in another crosspiece 14 or 16" farther back, not quite as long as the front one. Those outline the toe hole.



Example of mortise (hole) and tenon (tongue). Image:

<http://www.woodworkingarchive.info/skills-techniques/how-to-make-handcut-dovetail-joints.html>

Some people will make their snowshoes a little wider and put a third crosspiece behind the heel one to spread the tail to make a little extra area. I don't do that, because the rails are thicker back there. I can put the lacing in and it doesn't need the spreader.



Full view of snowshoes.

Image:

For the tail of the snowshoe I find a curved piece of wood, just a stick somewhat comparable to the saplings used for the back end of the snowshoe. I bring the sides together against that and usually put a rivet or a small bolt of some kind through them. That tailpiece will stick out 6" or more behind the end of the rails. It's curved up, because otherwise it will dig in when you back up.

Just ahead of the front crosspiece, your rails start to curve up gradually—no abrupt curves. That way, the lacing when tight will form a shed roof so that when you move your foot ahead, the snow will fall off the webbing. If it were flat and you were to go through deep snow, the snow would accumulate on top of your snowshoe, and you'd have to use energy to dump it off.

### **Webbing**

I use two different types of webbing. One is nylon net twine. You can get that in black, white or greenish. For ordinary use I always get the black. It's tarred but not sticky, and it lasts longer out in the light.

I usually use No. 9 or No. 6 for the mesh in front in back. The 6 is fairly fine. For under the foot I use No. 12. It's real strong stuff.

The other webbing material I used to use was babiche—rawhide lacing I made from caribou skin. I like that for the front and back, but for the underfoot part I prefer a heavier material made from either a moose hide or an ugruk<sup>2</sup> skin.

One nice thing about nylon is that you don't have to be so particular about protecting your snowshoes. It's a lot better in the springtime because it doesn't soak up water and get soft and baggy, the way babiche does.

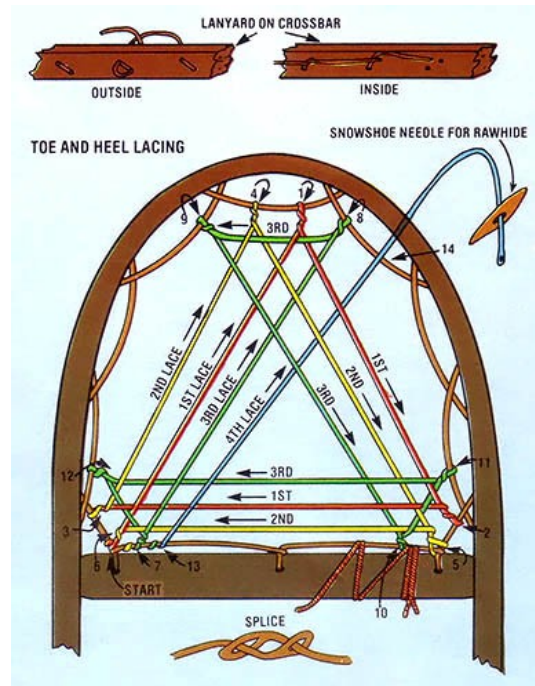
I can imagine that for someone who grew up in town and didn't have dexterity more or less built into his hands, it might be somewhat of a problem to figure those things out. But for me, it was just a matter of common sense.

I grew up fooling around with that sort of thing, and so was somewhat educated. I had a very wide variety of experiences with cutting things and making things. Later, when I had a new situation like those northern hides to deal with, I'd already had the experience of making thongs out of the tongue of a leather shoe and so on.

### Weaving patterns

What you're after is some kind of webbing so that won't sink down into the snow. If you don't have a pattern to show you how a traditional snowshoe is laced, there are books on the subject. Recently the Alaska Trapper's Association has published a how-to book about building rat boats and fish wheels and snowshoes, all of those things. The author is an expert in that sort of thing and writes about their particular skill. That would be a good place to start.<sup>3</sup>

Ordinarily I make a pair of holes through the frame from side to side, maybe half an inch apart. Then I go another two inches and make another set of holes, and so on. I put a little bit of heavier twine through those holes and loop it around the line where I started, and then go on to the next one.

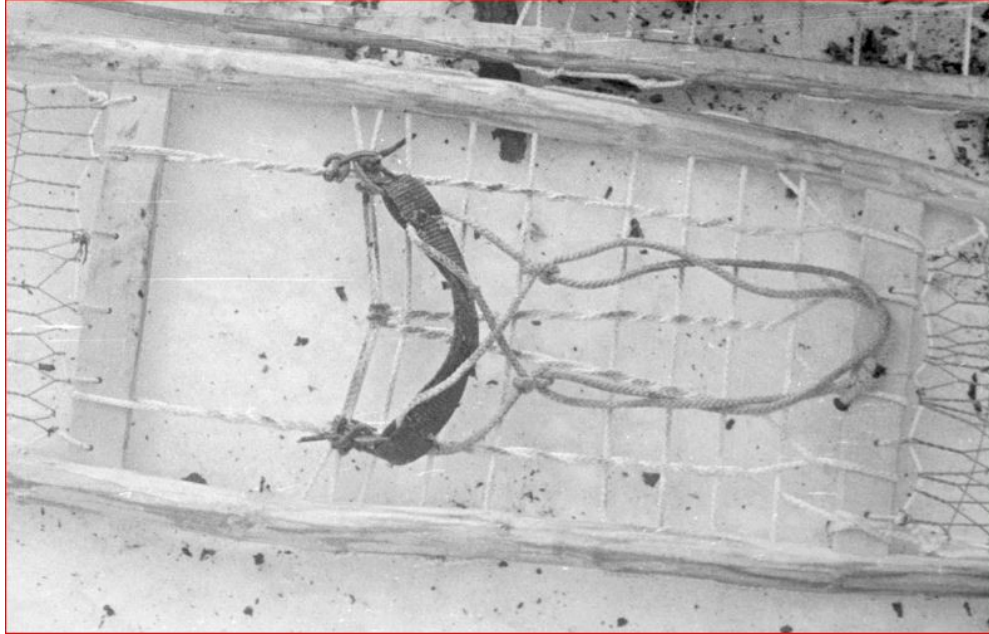


The heavy cord around the outside of the webbing is known as the "lanyard".  
<http://www.motherearthnews.com/diy/how-to-make-snowshoes-zmaz81ndzraw.aspx>

That makes a selvage that you wrap your mesh twine around. From there you can just go any way, back and forth, and then cross over the first twines. That is easier than the more

or less complicated traditional hexagonal weave. After the snowshoes get old and the twine has broken and has been patched, it starts looking kind of ratty anyway.

When I'm lacing the foot part of the snowshoe, I first put in the lacing that goes back and forth.



Center section, showing the toe hole lacing. Image: Curt Madison

I have a toe cord consisting of three or four strands at the back of the toe hole, right close together under the ball of the foot. The next strand will be back 1-1/4" from there. You don't want them too close together, because the snow will pack under your foot. When I get back toward the heel, I make a few side-to-side passes that are a little closer, maybe an inch apart.

That cord then switches direction by going through or around the crosspiece by the heel. From there I go underneath the cross cords all the way up and around the front crosspiece, and pull it tight. Then I start back, wrapping the cord around itself. I make a pass around the toe cord, and then continue wrapping the cord all the way to the back crosspiece.

This twisty wrapping pulls the bottom cord up against the cross cords, so you really have something snug there. If your snowshoe is fairly narrow, this will be the side of the toe hole opening.

When I go around the crosspiece in back, I take a half hitch, go ahead at an angle, and do the same thing. When I come to the toe cord, I take a wrap or two around it, and come back from there, using the same twisty wrap. I continue in this way until I've filled in the entire center section of the snowshoe.

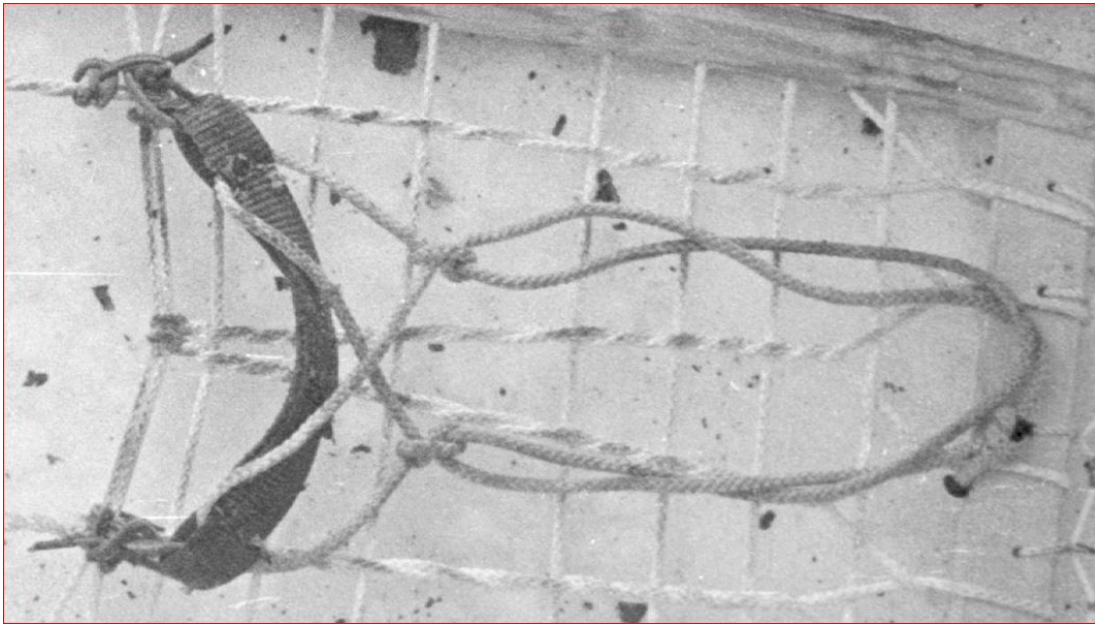
Eskimos don't leave much of a toe hole—they depend on flexing their toes more. Their harnesses also fasten more to the end of their toes, so when they pick up their foot, they kind of sling that snowshoe ahead. I like to have a toe hole big enough that I my foot doesn't slide down into that hole, but I can tip my toe down into it.

## Bindings

### Toe Strap:

I fasten a strap maybe an inch wide, usually of leather, to the main toe cord at the back of the toe hole. That strap has a couple of loops sewn in the ends of it. The adjustable part of the harness goes through the same loops, but is independent.

The toe cord, which is made of several strands lying close together, goes under the ball of your foot. That way your toes can tip down into the hole as you walk.



Detail of adjustable harness system. This time Oliver used cloth webbing and nylon cord instead of leather. Image: Curt Madison

### Thong:

- Put your boot snugly under the toe strap.
- Center the thong around the back of your heel and run the ends forward through the loops at the ends of the toe strap. (If your toe strap does not have those loops, simply take a half hitch around the intersections of the cords at the back corners of the toe hole opening.)
- Pass one end of the thong across the instep and take a couple of half hitches around the cord that is coming from the heel on the far side. Repeat with the other end.
- It doesn't hurt anything if you have 3 or 4" of cord hanging off to the side. If you have a lot of cord left over, you can tie both ends behind the heel.

Once you have adjusted the harness, you don't have to tie this again. You just you pick your harness, if it isn't laying up already, and then put your toe through sideways, get your heel down in there, and pick your heel up high enough that you can pivot your toe under the toe cord.<sup>4</sup>

You will have to retie the harness for different footgear.

I made up a version of this kind of harness, using thin parachute cord—the kind with fine threads inside surrounded by a woven sheath. I used Prusik knots, and found that after a lot of use, they got so tight that I couldn't adjust them.<sup>5,10</sup>

If you use fairly thick rawhide, it's not too hard to loosen up. The ends of the cord are made a little narrower and are a little more flexible, so when it comes around behind your heel, you can more easily tie it there.

In the springtime, when things get wet, you don't have near as much trouble keeping things adjusted if you're using twine. It can take a lot of monkey business keeping rawhide snugged up.

If that harness softens up, it won't stand up by itself. Quite often I fasten a string on it, a couple feet long, so that I can reach down and pull the string up to put my toe through. It's a lot easier to put your foot through when you're standing than when you're trying to kneel down.



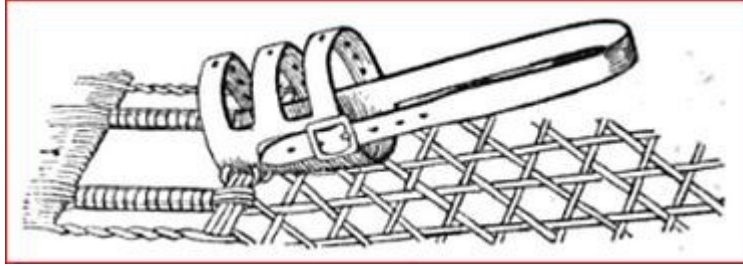
Babiche bindings and lift cord.  
Image: Rein or Heidi Dammann

Sometimes you don't need to have a string to lift the heel strap. You can nudge it up with the tip of your toe, and scoot your foot through.

All of this is to give people a rough idea. When they get to doing it, they'll find a way to make it work.

I was once snowshoeing with some friends from our place down to the Kantners'. When we were about halfway there, the lady's leather snowshoe binding broke. I pulled a 6' piece of parachute cord out of my back pocket, tied a version of this kind of binding for her, and we continued on our way.

You can also make a sandal out of commercial leather with a strap around the heel that goes around the side. The hole at the toe can come back on the top of your foot for three inches or so to hold that heel strap up. That gives you more surface to support your snowshoe. When you're lifting it up, you're not pulling on such a small part of your foot.



Sandal-type snowshoe harness<sup>6</sup>

If I make up that type of a harness—and I have used them quite a bit—I cut it out so that it's tied close to the toe cord. The upper part only wraps around your foot about half the side of your foot. You put your toe in, lift your heel, and tuck your toe under.

Commercial leather is good because in the springtime it doesn't get wet or stretch. Start out with a piece 3 or 4" wide. The front of that you tie down to the toepiece. You have holes and tie it down with rawhide. Immediately behind you cut it out so that it is riding maybe halfway down the side of your footgear. Then your heel strap is sewed or riveted to that. Being that wide, it's back on your instep and will hold the heel part up, and still leaves room that you can enter like a siwash<sup>7</sup> harness.

Again, the purpose in coming back over your foot quite a ways is to keep the heel strap from dropping down too much. Sometimes it's kind of a nuisance, because snow builds up on top of your foot.

You've got a piece that goes across your foot, long enough that you can tie the front down—actually, a little shorter than you would need as you leave adjustment room. Tie it down with a separate cord to the toe cord of the snowshoe. Cut it out enough that when you slip your foot in and twist it, there is room for your toe between the snowshoe and the harness and stick it forward into your toe hole.

Some commercial sets have a buckle. You would want it on the outside of your foot. That last harness does have a buckle.

When things stretch or you are changing footgear or the webbing gets loose under your foot, you adjust by shortening or lengthening the heel strap by means of the buckle. You can also tighten the thing where it fastens onto the toe cord. That toe strap usually lacks half an inch or so of coming down to the toe cord, so that there is room to adjust there.

Some of the old-timers would just take a pair of more or less worn-out shoepacks and fasten them down to the snowshoe in some way. Then, when they wanted to snowshoe, they'd just put their feet into the boots.

Instead of using this siwash harness, you can cut a band from an old motorcycle tire inner tube, if you are where one is available. Put the band around your ankle, put your toe through the toe strap, and slip the rubber band over the toe strap and then down under your foot.

That might not work right with big modern tires. In the old days, most cars didn't have such bulky tires.

I have used the rubber system, but I prefer the siwash harness with the string on the back. It's easier to get in and out of. With the other, you have to kneel down and use your hands.

### **Did you have a left snowshoe and a right one?**

Ordinarily not, but invariably one shoe will be a little more inclined one way or the other. I don't plan on that, but sometimes it works out better to use one snowshoe on a particular side.

### **Ski Poles**

More often than not, I used two ski poles, mostly for purposes of balance. I like to have poles long enough not to lose, maybe shoulder high, say five feet.

When the snow is deep and there is brush and stuff underneath, your snowshoes might carry right across, but there is a vacuum under the brush. You'll be going along, and all of a sudden one of your snowshoes sinks down, throwing you off balance. You need to support yourself or catch yourself on that side. Then, a little ways farther, the other one goes down. Sometimes both go down.

### **Bearpaw Snowshoes**

Ordinarily I would use my long snowshoes for breaking trails around where I am going to be working. I also have a pair of small bearpaws.

Bearpaw snowshoes are rounded on both ends, and some of them are fairly long. I make mine shorter, 16" long by 12" wide, because I use them on trails that I made the day before. By that time the snow had more or less set up, though it's not firm enough to walk without a snowshoe, by any means.

I make the heel of a bearpaw similar to the heel of a big snowshoe, but it's extra wide for that kind of use. As usual, it has an upward curve on it so I can back up.



Oliver's handmade bearpaw snowshoes.  
Image: Devta Khalsa

That tailpiece is notched out on each side and is maybe three inches wide, kind of a duckbill sort of thing, and it flares out to a much greater angle where the rails come back around.

When you walk, you can count on lifting your foot up and swinging it far ahead so that one track overlaps the other track a little bit.

To make bearpaw, I find a suitable sapling. Birch is best, but you can't find a bendable one in the winter, when the sap is down. I trim the butt end on the inside, bend it around, and bring it back down. Of course the wood is thawed out. I might soak it a bit with a towel, or in a big pan on top of the stove.

When you're bending wood, what happens is that the grain on the outside of the bend doesn't necessarily stretch a whole lot. But there are layers of summer wood and winter wood in there, and when you bend it the soft summer wood gets compressed.

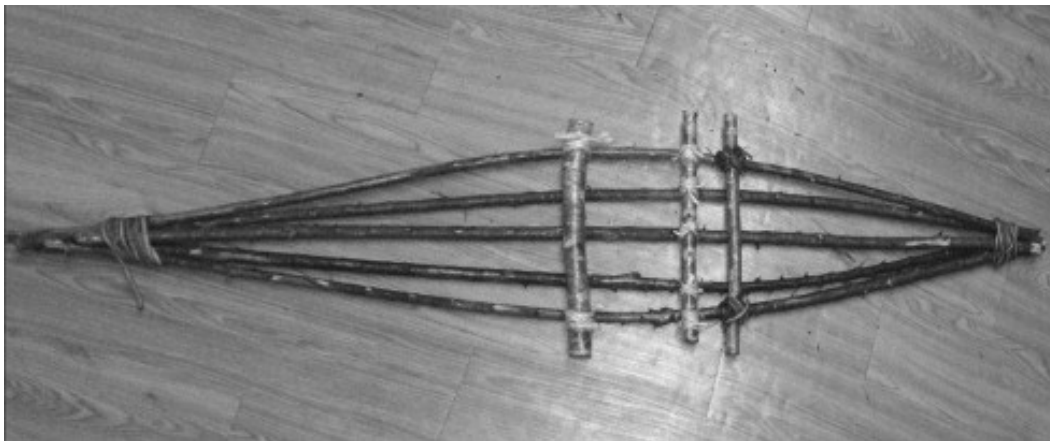
You don't just depend on bending to squeeze the summer wood—you help it along by striking it with your hammer. So if I want to make a pair in the wintertime, I'll drape it around the horn of my anvil and start pounding on it, flexing the wood as I go along. Of course that is a big help, because otherwise in bending it you are quite apt to have quite a few sticks that break, and then you have to start over again.

I don't ordinarily have any crosspieces. I just put a couple of extra strands at the back of the toe hole to leave room for your foot to work. The back part is webbed in, but I don't use the typical crisscrossed type of webbing.

Elmer Kreps has a couple of books that explain all this very well.<sup>8</sup> Of course I am talking about an adaptation. The Trapper's Association in Fairbanks also has a how-to book on building fish wheels, and I think they have an article on making snowshoes.<sup>9</sup>

#### What about improvising snowshoes in an emergency?

You can tie maybe five or six long sticks together at both ends. They are not big saplings and they don't have to be too stiff, since you have a number of them. Back in the middle you spread them out, force them out by tying them to a crosspiece. You'll need another for a heel crosspiece.



Example of stick snowshoes

Image: <http://wildernessguide.wordpress.com/2013/01/18/survival-branch-snow-shoes/>



Example of stick bearpaw snowshoes

Image: [http://www.ehow.com/how\\_5365551\\_make-own-snowshoes.html](http://www.ehow.com/how_5365551_make-own-snowshoes.html)

With the small ends of the sticks ahead, you tie sturdy twine from the front to the crosspiece to spring the front end up. That crosspiece is under your foot, where your heel is. There's no place toe hole, so your foot is going to have to flex a little bit.

You are making these for immediate use, so you can make them out of green wood. They will be a little heavy, but if you peel the sticks, they will dry surprisingly fast and loses weight in just a few days.

#### What about a spruce bough tied to foot?

Anything that makes your foot bigger would be a help. I have never had occasion to do that, but maybe one would have to. But in much of the North, you might not have boughs that are sturdy enough for that.



Example of bough snowshoes

Image: <http://www.pikpuk.com/members/dales-wilderness-survival/snowshoes.html>

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1) This essay stems from a series of telephone conversations that Ole Wik had with Oliver between December 2007 and February 2008. Highlighted text indicates remarks made by Ole.

2) Bearded seal (*Erignathus barbatus*)

3) From [http://www.outdoorsdirectory.com/store/product\\_info.php?products\\_id=645](http://www.outdoorsdirectory.com/store/product_info.php?products_id=645):

"Alaskans How to Handbook by Joe Dart, ISBN 978-0-9791608-3-7. The "How To" book is the brainchild of long-term ATA Editor Joe Dart. Joe wanted to preserve some of the skills necessary for life in The Bush. He interviewed the experts & put their thoughts into words & pictures which are easily understood. You can learn how to make snowshoes, a fish wheel, a dog sled and many other useful tools. This book is fascinating reading even if you never plan to actually construct the items described. It also makes an excellent gift."

4) These images show how to enter the harness:



1) Slip your toe through the main loop



2) Lift your heel and pivot your toe under the toe strap



3). Slide toe ahead and lower your heel.  
This can all be done with your mittens on.

5) Prusik knot.



Image: <http://storrick.cnc.net/VerticalDevicesPage/Ascender/KnotPages/KnotPrusik.html>

6) E.H. Kreps. *Camp and Trail Methods* (Columbus: A.R. Harding, undated), 154.

7) According to [www.oxforddictionaries.com](http://www.oxforddictionaries.com), “siwash” is Chinook Jargon, from Canadian French sauvage 'wild', and refers to an American Indian of the northern Pacific coast.

8) Kreps, *op. cit.*, 157-175.

9) See footnote 3.

10) Below is an image of my variation of Oliver’s harness system. It uses a separate length of rope for each side. In this case I used solid-braided parachute cord, which does not seize up as tightly as lighter grades of cordage.

To study the construction, let’s start with the lower half in the image. Begin by winding the cord around the toe rope of the snowshoe four times. The multiple wraps stabilize the

cord and prevent it from sawing through the toe rope.

The longer end then runs back behind the heel of your boot and attaches to the long end of the other cord with an adjustable knot (a Prussik).

The short end of the cord first secures the four wraps with a cow hitch (shown separately below), then goes upward to link with the other short end across the top of your footgear, and finally returns and ties to its own long end with a clove hitch.

Tie the upper length of rope similarly (except for the Prussik).



The cow hitch is a kind of mini-Prusik:

Image: [http://www.iwillknot.com/cow\\_hitch/](http://www.iwillknot.com/cow_hitch/)

For easy access and adjustment, make the second harness a mirror image of the first, so that the Prussiks will be on the outside of your feet.