

Toboggan Making Instructions



NEW: Video instructions available at:

<https://youtu.be/hRLyNB9AyaQ>

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Version 2.0, Aug. 2018

<http://lureofthenorth.com>

Note: This booklet is part of a series of DIY instructional booklets. For all other publications in this series, please see our website at lureofthenorth.com.

Published instructional booklets can be found at: <https://lureofthenorth.com/instructional-booklets/>

Booklets in the Toboggan Making Series

Book 1: Preparing a kit (Not yet released);

Book 2: Assembly & Outfitting (This book);

Note 1 – Acknowledgements: Trail toboggans are an ancient technology, and thus have been influenced by many generations of people before us.

Our modern rendition has probably been most heavily influenced by the following people:

- Garrett Conover and Alexandra Conover Bennett provided the inspiration to first start using these crafts;
- Chris Evavold of Black River Sleds provided many examples of outfitting refinements.

Note 2 – Lure Toboggan Making Kits: These instructions are intended to be accompanied by our Toboggan Making Kit, which is available through the “Store” section of our website at: <http://lureofthenorth.com/shop>. Of course, you can also gather all materials yourself and simply use these instructions as a guide, modifying to suit your requirements. An eventually-released Booklet 1 will provide details on preparing your own kit.

Direct link to the toboggan section of the store:

<https://lureofthenorth.com/shop/product-category/equipment/tobs/>

Note 3 - Distribution: Feel free to distribute these instructions to anyone you please, with the requirement that this package be distributed in its entirety with no modifications whatsoever. Thanks!

Note 4 – Feedback and Further Help: Feedback is welcomed to improve clarity in future editions. For even more assistance you might consider taking a toboggan making workshop with us. These workshops are run throughout Ontario, and includes hands-on instructions and all materials. Again, check the website for more details and a current schedule: <https://lureofthenorth.com/calendar/>

Our Philosophy: This booklet describes our understanding of a (in this case, somewhat) traditional craft – these skills and this knowledge has traditionally been handed down from person to person and now we are attempting to do the same. We are happy to have the opportunity to share this knowledge with you, however, if you use these instructions and find them helpful, please give credit where it is due. We have worked hard to produce this package and would appreciate any acknowledgements given. Thank you.

- The Lure Team, Kielyn & Dave Marrone

Version 2.0, September, 2018

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0.0 What Makes a Trail Toboggan so Great?

Trail toboggans are quite simply *the* most versatile hand-hauled craft for winter travelers. Long and narrow, the toboggans are designed to keep a load low to the ground for maximum stability. The large running surface allows the toboggan to float in your snowshoe track and go anywhere you do – regardless of snow conditions. Because it is flexible, a toboggan gracefully follows the contours of undulating terrain, and crests fallen trees readily. Toboggans are all cut in the traditional ‘coffin-shape’ for improved turning performance.

0.1 DIY Benefits

Building your own trail toboggan gives you a much better appreciation of how the toboggan works, and why it is constructed the way it is. This will leave you more well prepared to fix any damage that is incurred on the trail, or make customizations to future toboggans you might make.



Illustration 1: Happy Toboggan Crafters!

1.0 Material Lists

1.1 Kit Contents:

Toboggan kits from Lure of the North come in standard and premium versions in 8', 10' and 12' lengths. Aside from different qualities of plastic used for the running surface, everything else is identical for premium and standard kits.

Please consult the chart below for your length of toboggan and make sure all of the below have been included with your kit:



Illustration 2: The contents of a Lure Toboggan Making Kit

TABLE: Toboggan Making Kit Contents

Component	Quantity		
This instructional booklet	1		
Plastic blank: 1/4" x 15". Cut to a 'coffin' shape with holes pre-drilled.	8'	10'	12'
White Ash crossbars. Dimensioned, rounded & notched to receive running lines.	6	7	8
5mm cord for running lines;	10m	14m	18m
5mm cord for haul lines;	2 x 3m		
1" tubular nylon webbing for brake line;	1.5m		
#8 x 3/4" flat-head, stainless steel screws;	16	19	22
#8 stainless bolts & tee-nuts	10	12	14
#8 x 3/4" pan-head, stainless steel screws;	5		
LotN's custom leather tump	1		
3mm cord for prussiks (+ 1 template piece)	4m	6m	8m
Brass lashing rings	10	12	16
Polyester Lash straps;	1	2	2
Stainless steel buckles, sewn to polyester loops	1	2	2

*Lengths of cords, haul lines, brake lines, etc are constantly being refined and tweaked, and may not exactly match the lengths listed above. The important thing is the lengths you receive will work for completing your toboggan. If for some reason, that's not the case, please contact us!

1.2 Items Not Provided



Illustration 3: You supply a few standard household items

You will need to supply all (or most) of the following to complete your toboggan assembly:

- Drill/ driver with the following bits:
 - 7/64", 11/64", 15/64", 1/4";
 - 1/2" countersink bit;
 - #2 Robertson drive bit;
 - #2 Phillips drive bit;
- Hand screw driver;
- Electrical tape to mark drill depth on bits;
- Linseed oil, marine spar varnish or your favourite exterior wood finish and applicator;
- Measuring tape and marker;
- 2 x small clamps;
- Scratch awl (can be homemade, instructions provided);
- Smooth-faced hammer;
- Heat gun, hair dryer or other heat source;
- Lighter for heat sealing cord ends;
- OPTIONAL: Knife and sandpaper for rough edges;
- OPTIONAL: One 2 x 4 lumber to elevate plastic and facilitate clamping.

2.0 Prepare Your Crossbars

You have received 6 - 8 partially finished White Ash crossbars, including one specialized "headboard". These need to be finished in following manner:

1. Clean and sand any other portions of the crossbars as needed to clean any stray fibres or saw marks that might bother you;
2. Apply an exterior finish to the crossbars and allow to dry. I like two layers of linseed oil, though marine spar varnish would also be a suitable choice.

3.0 Prepare Your Plastic

This is primarily an information step, designed to help familiarize you with the layout of the toboggan.

- Your plastic sheet has been pre-cut to a 'coffin-shape'. That is, it is tapered to both ends. There is a short, sharp taper at the front or 'head' of the toboggan, and a longer, more gradual taper at the end or 'tail' of the toboggan.
- You will notice there are holes pre-drilled into your plastic sheet. These indicate the locations of the crossbars. Holes may not have been pre-drilled for the first and last crossbars, as their locations are obvious.
- Each crossbar will receive 5 stainless fasteners (typically a mix of screws and bolts), however only the three interior holes have been pre-drilled. This is because the location of the two outside screws must be quite precise and will be determined by you only after the crossbars have been installed.

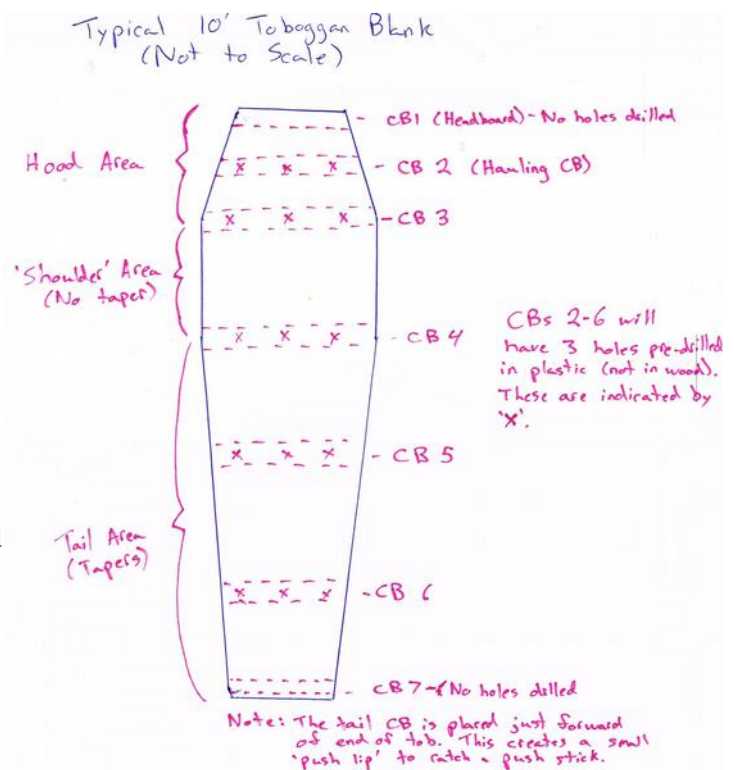


Illustration 4: Getting acquainted with your toboggan blank. See the appendix for a full-size image.

1. If desired, you can take a sharp knife, and clean up any rough edges on your toboggan blank.
2. If you follow a set of three holes out to the edge of your plastic, you should see, just faintly, a bit of black marker on the side of the plastic (Yes, its black on black, but look for a bit of a darker spot). This mark helps you to centre your crossbar over the drilled holes. If you don't see this mark, then you can use one of your longer crossbars as a straight edge to mark them yourself. Just align the crossbar along a set of 3 holes, and make a mark on the side of the plastic. Make marks like this on both sides of the plastic for each set of pre-drilled holes.
3. If there are any rough marks on your toboggan plastic, place that surface down now. You will want to have the smoothest side facing up during construction as it will later become the sliding surface.



Illustration 5: Use the pre-drilled holes to place marks that will later help in aligning crossbars.

4.0 Install Standard Crossbars

4.1 The Three Interior Screws

- With the exception of the headboard, all crossbars will be screwed from the bottom up - through the plastic first.
 - This step is most quickly completed with 3 drills: 1 to drill pilot holes, 1 to countersink and 1 to drive screws.
1. Place the plastic on a 2 x 4, or use another means to elevate the edges of the toboggan to facilitate easier clamping;
 2. Place crossbar #2 underneath the plastic and aligned with the first set of holes on your toboggan (~ 12" back from the front edge). Check for the bit of marker we placed earlier to indicate CB location. The crossbar should be oriented such that the flat edge is against the toboggan, and the rounded edges are away from the toboggan.
 3. Most crossbars are cut just short of the width of the toboggan. Orient the CB so that it is centered in the sheet of plastic. I.e. the plastic should overhang the CB equally on either side.
 4. Clamp the CB in place;



Illustration 6: Elevating the centre of the toboggan (on the 2x4) makes slipping clamps in much easier.

5. Using the holes already provided in the plastic, drill 7/64" pilot holes in the wooden crossbar. It is helpful to mark the desired depth of your drill bit with a marker or piece of tape.
6. Drill countersink holes as shown in the photo.
Note: While integrated pilot/ countersink bits seem like a great idea, in practice we have found them to get gummed up with the plastic and not work as well as the independent systems described here.
7. Using a variable speed drill or driver set to low speed, drive the three stainless screws.
8. Repeat for remaining standard crossbars.
Important: See note below for special instructions for final crossbar.
9. For the final crossbar:
 - i. Place the final crossbar about 1/4" forward of the rear of the plastic. This will create a small (1/4") 'lip' of plastic which protrudes to the rear of the CB. This lip, while not entirely necessary, can be useful for catching a 'push stick' when a second person is helping push a toboggan from the rear.
 - ii. There will only be 2 screws in the final crossbar, along with 4 bolts. The holes may be pre-drilled for the 2 screws. If so, install as with all other screws. If the holes are not pre-drilled in the plastic, you will have to determine their location yourself. These holes are placed at 1/4 and 3/4 the width of the toboggan plastic. For example, if your toboggan is 12" wide at the final crossbar, then you will install the screws at 3" and 9".
10. You can remove the 2x4 that you had previously elevated the toboggan on.



Illustration 7: Bit depth marking

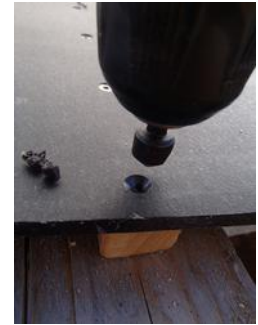


Illustration 8: Countersink hole

4.2 Crossbar #2 - Outer Edge Screws

1. After all crossbars (with the exception of the headboard) have been attached, it is time to go back and install the remaining two fasteners for each. For most crossbars, these are through-bolts. Because CB #2 never takes a pull-out force, it doesn't require the greater strength the bolts afford. It will be fastened with two more screws installed exactly as all others.
2. This screw will go about 1/2" in from the edge of the crossbar.
3. Hardwood is prone to splitting so close to the edge of the board. Drive the screw with the slow-speed drill. If necessary back out and drive a slightly bigger, or deeper pilot hole.

4.3 Remaining Crossbars – Outer Edge Bolts

1. CBs 3 and onwards will receive through-bolts and tee-nuts for their greater pullout strength. These are best located from above to ensure the best finished look on the top of the crossbars.
2. Flip the plastic over so you can see the CBs. The bolt is going to go through that small section of wood between the end of the crossbar and the groove for the running line, and you want to make sure that the nut isn't going to hang off the end of the crossbar either.

3. Place the tee-nut on the CB in the position described above, and mark the centre of the nut with a scratch awl. If you don't have a scratch awl, a serviceable one can easily be made with a nail and a chunk of wood. See Appendix for instructions.
4. Continue down the toboggan, marking each CB in this way at both ends.
5. Drill an 11/64" hole on your marks, through both the crossbar and the plastic.
6. Enlarge the hole in the CB to accept the post of the tee-nut. This is done with a 15/64" bit on slow speed. The depth of the hole should be slightly greater than the length of the post of the tee-nut, which is about 3/8".
7. Flip the toboggan over and countersink the plastic in the same manner that you did for previous screws. Do this for all holes.
8. Flip the toboggan over again, blow out any saw dust or plastic shavings in each hole. This step is important as a clean hole helps to prevent cross-threading and binding of the bolt.
9. Slip a nut into each hole and set with a couple of hammer blows.
10. Flip the toboggan again, drop the bolt into the hole and tighten up by hand. The bolt should thread into the nut quite readily until it tightens down into the plastic. The fine threads seem to bind and cross-thread easily, so if the bolt doesn't want to thread nicely, back it out and check for an obstruction.



Illustration 9: Marking the bolt location in the centre of the nut.

4.4 Additional Bolts for Tail Crossbar

1. The final (tail) crossbar will receive a couple of additional bolts to provide added strength for lowering the toboggan down a steep hill off of the tail crossbar, or if someone hauls on your tail uphill for a bit of help up. You will find an additional groove in the middle of the tail crossbar that is there to accept the brake line. These additional bolts will go just off-centre, outside of this groove.
2. Using the tee-nuts as a template and your scratch awl again, place marks about 1" each side of centre of the tail crossbar.
3. Install additional nuts and bolts at these locations, as described above and pictured below.



Illustration 10: Location of 4 through-bolts on tail crossbar.

5.0 Drill Holes for Haul Lines

1. CB #2 is your 'hauling crossbar'. Drill "through-holes" using the 1/4" bit ~ 1" in from either end. These holes pass through the CB and the plastic in the location indicated in the photo to the right.



Illustration 11: Hole location in CB#2 for Haul Lines

6.0 Install Headboard

1. The headboard is a breeze to install after the standard crossbars.
2. Flip the toboggan over so you are looking at the crossbars and the load carrying surface of the plastic.
3. Slip the HB over the front edge of the plastic. The logo should be facing away from you at this point. It will be visible when you curl the hood up later.
4. Drill five evenly-spaced pilot holes in the location of the screws in the photo below. (You can use your tape measure here to get these holes evenly spaced). Set the first holes $\gg 1\text{-}1/2''$ from the edge to minimize splitting.
5. Attach headboard using the supplied pan-head screws. Drive the end screws in carefully and watch for splitting. If necessary back out the screw and drill a larger pilot hole.
6. ~ 1" from either edge of the HB, and just forward of the screws, drill a 1/4" though-hole, through both layers of the HB and the plastic. This will later accept the running line and hold the hood curl in place. The location of this hole is shown in the photo.



Illustration 12: Headboard layout showing location of screws and hole to accept running line.

7.0 Install Running Line

- The running line should be kept nice and tight as it is fixed to the toboggan, basically as tight as you can pull it without causing deflection or warping of the toboggan plastic.
1. The running line is the longer section of 5mm cord that has been supplied (the 5mm cord is the

heavier cord).

2. Find the centre of the running line and tie a Figure-8-on-a-bight knot (See Appendix).
3. Pass both ends of the running line through the centre notch of the rear crossbar, from back to front.
4. Pull the running line so that the figure 8 knot is tight to the rear of the crossbar.
5. Working with one end of rope, pass it through the side-notch on the rear CB from front to back.
6. Pass the rope over the CB and under the notch a second time, again from front to back.
7. Pass the rope under itself and over the CB
8. See the following photo

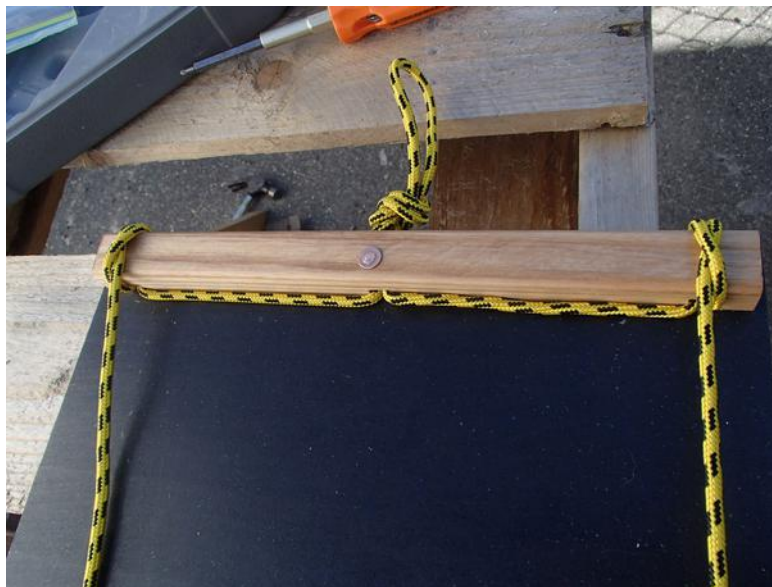


Illustration 13: Running Line Detail at Rear of Toboggan

9. Continue bringing the running line forward and fix it to each CB by means of a clove hitch - tied as such (See appendix for detail):
 - i. Pass the line over the CB from back to front;
 - ii. Pass the line through the CB notch from front to back;
 - iii. Pass the line over the CB from back to front, and have this second pass cross over your first pass as you do so;
 - iv. Pass the line through the CB notch a second time from front to back;
 - v. Pass the line over the CB and under pass #2, so that when you tighten the line it cinches on itself.



Illustration 14: Clove Hitch on Crossbar

10. Continue bringing the running line forward, affixing to each CB with a clove hitch until you reach CB # 3. Affix with a clove hitch as usual.
11. Repeat for the other half of the running line up to and including affixing to CB #3.
12. You will notice that CB # 2 does not have notches, as it is not connected to the running line. Instead pass the line directly through the holes that you previously drilled in the headboard.
13. You are now ready to create the hood curl at the front of the toboggan, but first you will need to apply some heat.

8.0 Create Hood Curl

- It is possible and quite easy to curl the hood of the toboggan without first warming the plastic, however using heat is a requirement to reduce stress in the plastic.
 - When the hood is curled, the inside (concave) portion of the curl is put under compression, while the outside (convex) portion is put under tension. The greatest forces are in the middle of the curve, around CB #2.
 - If you do not have a heat gun or hair dryer, a propane torch could probably be used very carefully and in a safe environment. Likewise, suspending the front 2' over a woodstove would work, but should be done with care.
1. Using a heat gun or hair dryer, warm the plastic to be curled. Focus primarily on the area around CB #2 and on the outside (tension) side of the plastic. Spend 5 – 10 minutes warming the plastic. If you warm the outside more than the inside, you will see the plastic start to curl a little bit on its own as you allow one side of the plastic to relax more than the other. This is a sign that the toboggan is probably ready for bending.
 2. Bring the toboggan to the floor. While kneeling on the toboggan, pull the hood up and towards you, forcing it into a curl.
 3. You may have passed the running line through the headboard already. If not, do that now. Tie an overhand "stopper knot" in the running line to hold the hood curl in place (See Appendix).
 4. Repeat for the other side to complete the hood.
 5. Step back and look at the curl. Adjust for evenness and for aesthetics. For HDPE toboggans, we recommend a modest hood recurve of less than 180 degrees. With the more flexible UHMW-PE toboggans a tighter curl is possible.

6. You should still have 2 small tails of running line remaining. Tie your two tails together using a double-fisherman's knot to create a small "grab-handle" at the front of your toboggan. This handle should not be so long that it drags on the snow in front of your toboggan.

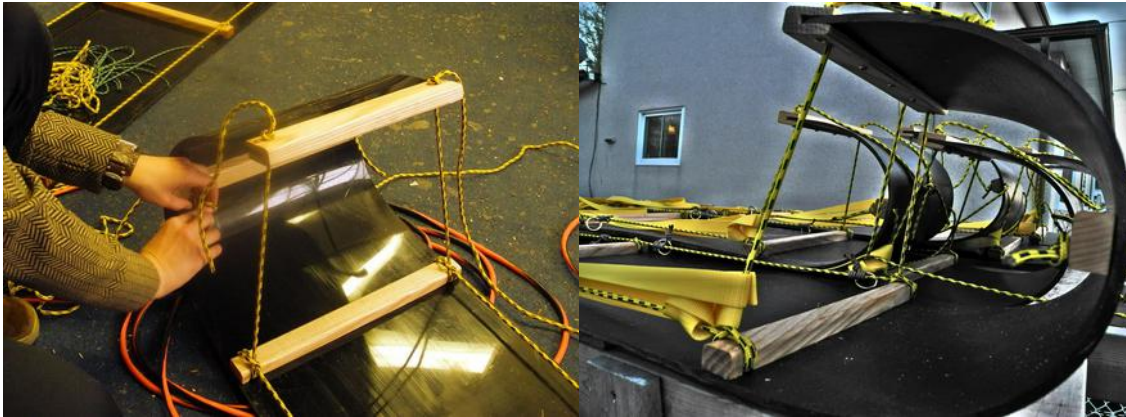


Illustration 15: Hood Detail - Stopper Knots Illustration 16: Hood Detail - side view

9.0 Install Brake Line

Home Stretch!

1. Install the brake line at the rear of the toboggan using a water knot (See Appendix).
2. Tie an overhand 'stopper' knot at the free end of the brake line to create a simple 'handle' that will not catch roots, rocks, etc.



Illustration 17: Brake line.

10.0 Install Haul Lines & Tump

1. The haul lines are passed through the holes in CB#2, and a stopper knot is tied behind the CB to prevent the lines from passing back through; (This can be just barely seen at the right edge of Illustration 16 above).
2. Attach the tump to the free end of the haul lines by means of a bowline knot. (See Appendix).
3. OR, for an adjustable haul line length, secure the haul line to the tump by means of a taut-line hitch. This taut-line will then be adjusted to create a longer hauling line while on lakes/ flat terrain, and would be adjusted for a shorter haul line when on portage trails. (See Appendix).

11.0 Install Lash System

11.1 Straps and Buckles

1. The lashing system is a 2-part system, composed of an independent strap and buckle. Both components of the lash system are attached to the toboggan running lines by means of a Girth Hitch (see Appendix).

2. For longer toboggans we prefer to use 2 separate straps as opposed to one long strap. See the diagram below for the recommended locations of the straps and buckles for your length of toboggan.
 - i. "S" indicates a strap;
 - ii. "B" indicates a buckle;
 - iii. "R" indicates a ring (installed next);
 - iv. The dotted line indicates the typical flow of the lash system.

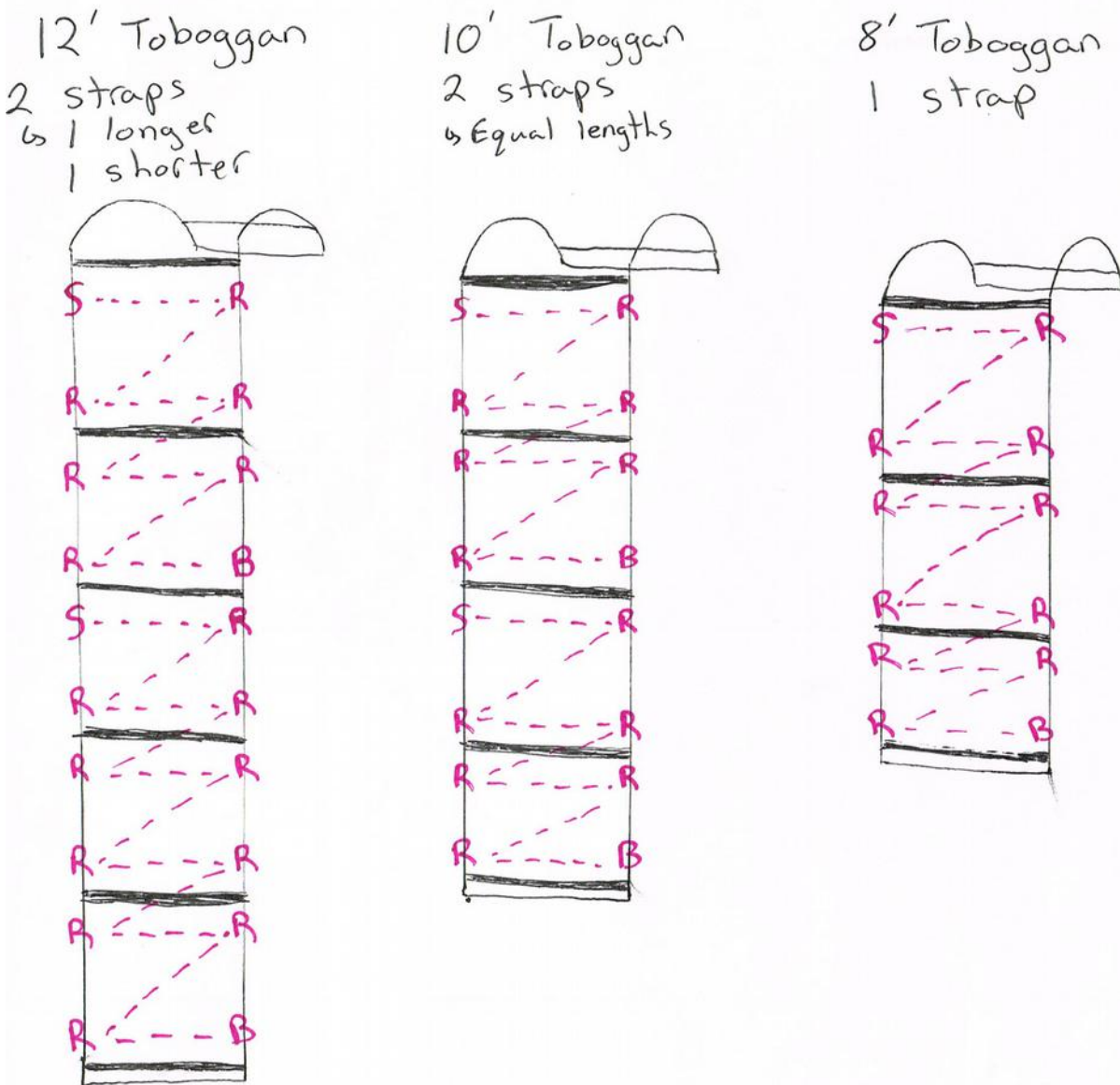
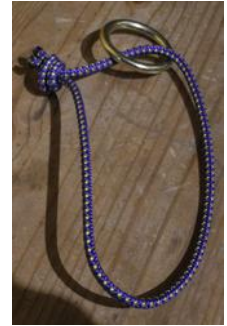


Illustration 18: Toboggan Lash Systems

12.2 Lashing Rings

- While the lashing strap could simply be passed directly around the running lines to secure the load, we prefer the use of brass rings to reduce friction and allow easier lashing and unlashng of the load.
 - These brass rings are secured to the running lines by means of prussik knots. Prussiks are a friction hitch. When force is applied to the brass ring, the prussik will bind and not move, but by pushing on the prussik itself you can easily move it along the running line. This allows you to set the rings at any location along the running lines and easily adjust as necessary to accommodate different loads.
 - Steps 1 & 2 may have already been completed for you in your DIY kit, or you may receive a chunk of cord and have to cut and seal yourself.
1. Cut your 3mm cord to ~ 18" lengths. You will require 10, 12 & 16 lengths for 8', 10' and 12' toboggans respectively.
 2. Seal the ends of the cords with a candle flame or rope cutter.
 3. Tie each length of 3mm cord around a brass ring using a One-Sided Overhand Bend (see Appendix).
 4. Secure the cords to the toboggan running lines at the locations specified in the diagram above by use of a 3-wrap prussik knot. (See Appendix).



13.0 Enjoy!

Get out there and use that new toboggan - preferably for multiple days on end!

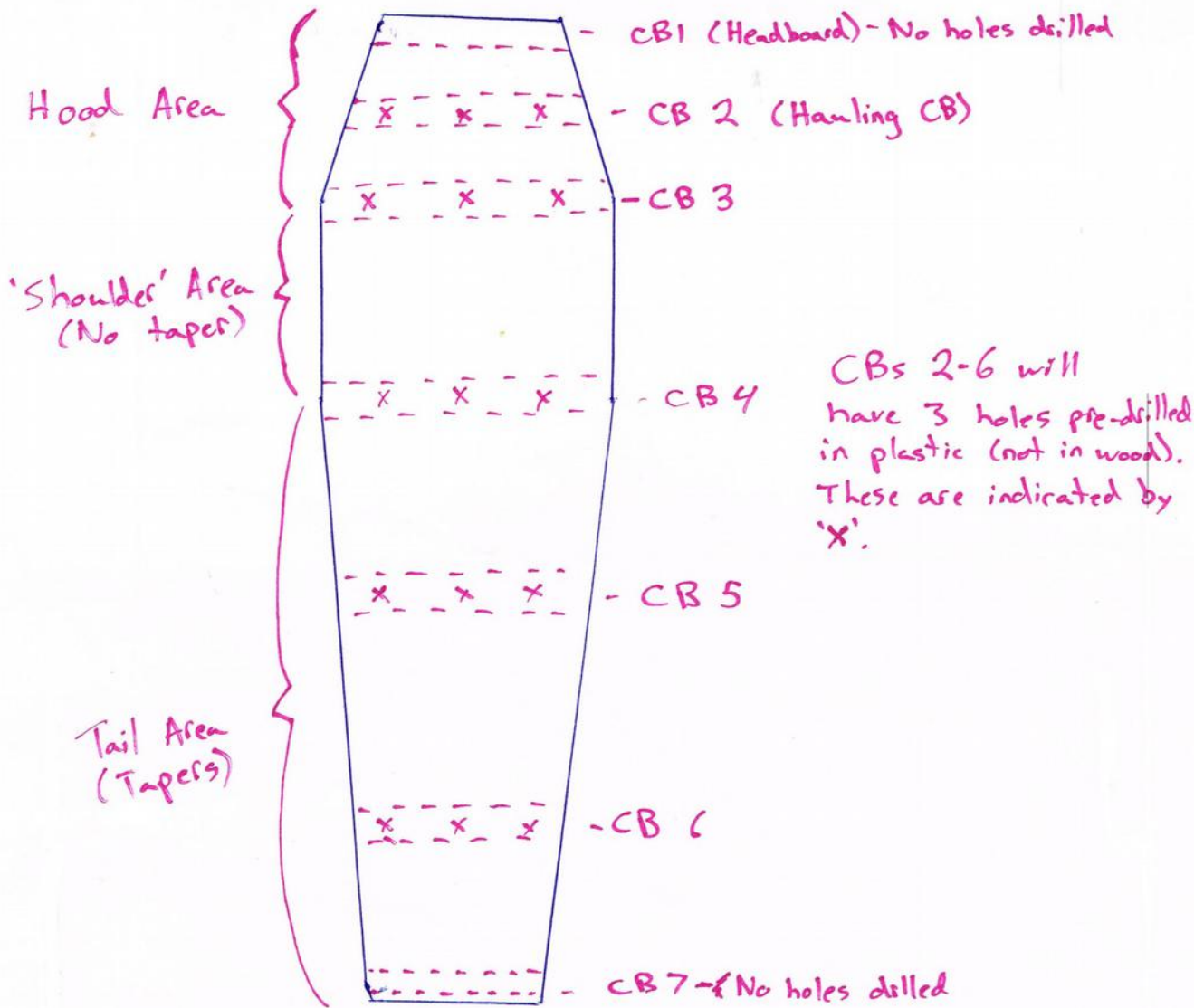


Happy Crafting!

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Appendix 1: Toboggan Blank Layout

Typical 10' Toboggan Blank
(Not to Scale)



Note: The tail CB is placed just forward of end of tob. This creates a small 'push lip' to catch a push stick.

Appendix 2: Know your Knots

Figure-Eight On a Bight: http://en.wikipedia.org/wiki/Figure-eight_loop

Clove Hitch: http://en.wikipedia.org/wiki/Clove_hitch

Overhand Stopper: http://en.wikipedia.org/wiki/Overhand_knot

Water Knot: http://en.wikipedia.org/wiki/Water_knot

Bowline: <http://en.wikipedia.org/wiki/Bowline>

Taut-Line Hitch: http://en.wikipedia.org/wiki/Taut_line_hitch

One-Sided Overhand Bend: http://en.wikipedia.org/wiki/One-sided_overhand_bend

Prussik Knot: <https://en.wikipedia.org/wiki/Prusik>

Girth Hitch: http://en.wikipedia.org/wiki/Girth_hitch

Double-Fisherman's Knot: https://en.wikipedia.org/wiki/Double_fisherman%27s_knot

Appendix 3: How to Make a Scratch Awl

If you do not have a scratch awl, you can easily make a decent one yourself using the instructions below.

1. Find a hardwood handle ~ 6" long. This could be a piece of dowel, a dry branch or a piece of wood that you've rounded the corners on.
2. Snip/ file/ cut/ grind the head off an 8d or larger nail.
3. Put the nail in your drill, and use it as a drill bit to drill a hole in the end of your hardwood handle.
4. Remove the nail from the drill and drive it backwards into the handle so that the point is sticking out. Leave an inch or more of the nail protruding from the handle, depending on the nail's original length and your intended use. Use wooden "influencers" here to avoid dulling your nail overly much.
5. Sharpen the nail if desired.
6. Carve your name in the handle so everyone will know who created such a masterpiece.