

# Toboggan Making Instructions



Booklet 2: Assembly

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<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](http://lureofthenorth.com).

Published instructional booklets can be found at: <http://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:

- Craig MacDonald has been credited as one of the first to use polyethylene as a toboggan running surface;
- 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.

**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: <http://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 1.0, December 2013

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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!*



**TABLE: Toboggan Making Kit Contents**

Component	Quantity		
	Plastic blank: 1/4" x 15". Cut to a 'coffin' shape with holes pre-drilled.	8'	10'
White Ash crossbars. Dimensioned, rounded & notched to receive running lines.	6	7	8
5mm cord for running lines and haul lines;	16m	20m	24m
1" tubular nylon webbing for brake line;	2m		
#8 x 3/4" flat-head, stainless steel screws;	24	29	34
#8 x 3/4" pan-head, stainless steel screws;	5		
#9 x 1 1/2" copper rivet and burr;	1		
Hardwood rivet setter	1		
LotN's custom leather tump	1		
Complete lashing system, including:			
3mm cord for prussiks	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



## 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 with the following bits:
  - 7/64", 1/8", 11/64", 1/4";
  - 1/2" countersink bit;
  - #2 Robertson drive bit;
- Electrical tape to mark drill depth on bits;
- Linseed oil, marine spar varnish or your favourite exterior wood finish and applicator;
- Straight edge, measuring tape and marker;
- 2 x small clamps;
- A small rasp or sandpaper to soften edges of crossbar holes;
- OPTIONAL: One 2 x 4 lumber to elevate plastic and facilitate clamping.
- The following optional items to install a copper rivet:
  - Metal snips;
  - Ball-peen hammer;
  - Anvil, concrete or other suitable pounding surface.

## 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. Using the rasp or sandpaper, soften the edges of the notches in the crossbars. This helps to prevent damage to the running line as it passes through the cross bars.  
Note: Crossbars 1 (the headboard), and 2 (the hauling board) do not have notches, while the last crossbar has three notches.
2. Clean and sand any other portions of the crossbars as needed to clean any stray fibres;
3. 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 screws, 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 only after the crossbars have been installed.

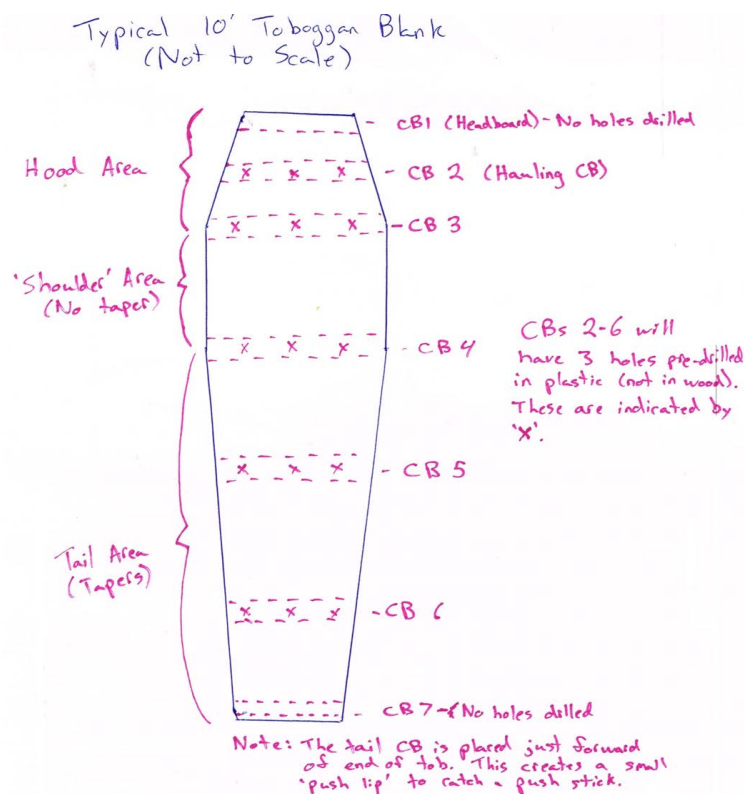


Illustration 4: Getting acquainted with your toboggan blank. See the appendix for a full-size image.

1. If desired, you can take a sharp knife, and clean up any rough edges on your toboggan blank.
2. You can also take time at this point, to extrapolate out from the 3 pre-drilled holes at each CB location, to the edge of the plastic. That is, align a ruler along the three holes, and using a marker place a mark at each edge of the toboggan. This will help in aligning CBs in the next



step.



*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

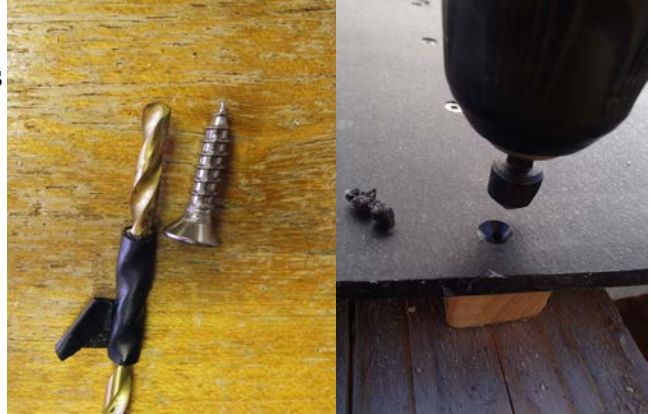
- With the exception of the headboard, all crossbars will be screwed from the bottom up - through the plastic first.
  - This step is most quickly completed with 3 drills: 1 to drill pilot holes, 1 to countersink and 1 to drive screws.
1. Place the plastic on a 2 x 4, or use another means to elevate 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). 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. Ie. the plastic should overhang the CB equally on either side.



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

4. Clamp the CB in place;
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.



*Illustration 8: Bit depth marking*

*Illustration 7: Countersink hole*

7. Using a variable speed drill 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. Skip the centre hole on the final CB. You will only be driving two screws at the moment.

## 4.2 The 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 screws for each.
2. The larger, 1/8" bit is used for pilot holes for the outside screws to reduce the likelihood of splitting.
3. The location of the pilot holes is important because there is only a very small "sweet spot" between the outside of the crossbar, and the notch which has been cut into the CB. Therefore this section of CB is very prone to splitting. Get the pilot hole drilled right in the middle of the section of wood b/w the end of the CB and the notch.
4. Drive the screw with the slow-speed drill. Watch for splitting, back out if necessary and use a 9/64" bit as pilot hole if absolutely necessary.



*Illustration 9: Hole location in CB#2 for Haul Lines*

## 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.

## 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 as indicated by the Xs or closed dots in the photo below.
5. Attach headboard using the supplied pan-head screws.
6. ~ 1" from either edge of the HB, and inline with 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 indicated by the open circle in the photo.



*Illustration 10: Headboard layout showing location of screws and hole to accept running line.*

## 7.0 Drill Hole for Rivet

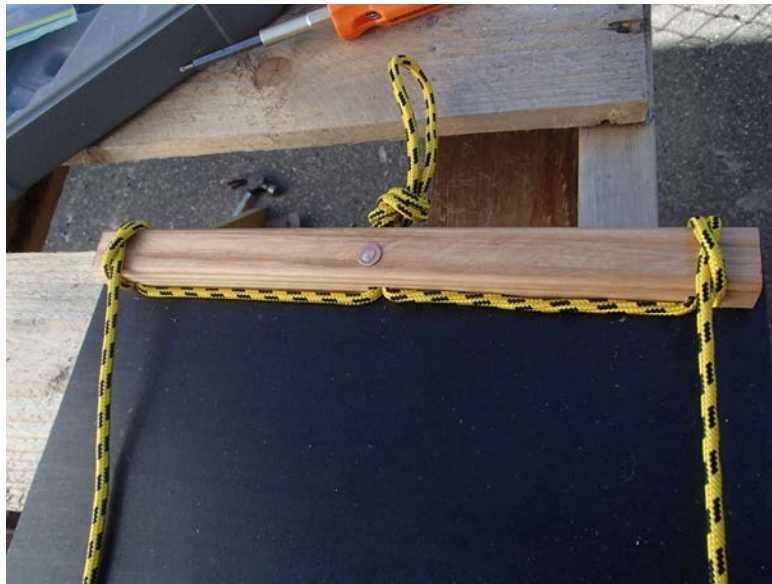
- This rivet is used because the rear crossbar takes more lateral force than the other crossbars in down-hill braking applications, or when "backing up" your toboggan, therefore a stronger fastener than the standard screws is recommended. The copper rivet in the rear crossbar is also a nod to the wonderful toboggans made by Chris Evavold at Black River Sleds. You could also use a stainless through-bolt and "T-nut" for the same result.
1. An easy step. Drill an 11/64" hole through the centre of the rear crossbar. This should be

centred right through the middle notch on the crossbar. Continue the hole through the plastic.

2. Flip the toboggan over and countersink the plastic to accept the rivet head.
3. It is easier to force the rivet past the running line, than vice-versa, so your rivet will be installed later, after the running line has been installed.

## 8.0 Install Running Line

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. [This point is a great time to ensure your rivet will squeeze past the running line, before you tighten everything up. Install the rivet from bottom-up. You may need to press hard, and wiggle the running line back and forth until the rivet squeezes past. Do not worry about completing the rivet at this point. Just leave it in place. ]
5. Pull the running line so that the figure 8 knot is tight to the rear of the crossbar.
6. Working with one end of rope, pass it through the side-notch on the rear CB from front to back.
7. Pass the rope over the CB and under the notch a second time, again from front to back.
8. Pass the rope under itself and over the CB
9. See the following photo (note your rivet has not been finished yet and will look different)



*Illustration 11: Running Line Detail at Rear of Toboggan*

10. 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):

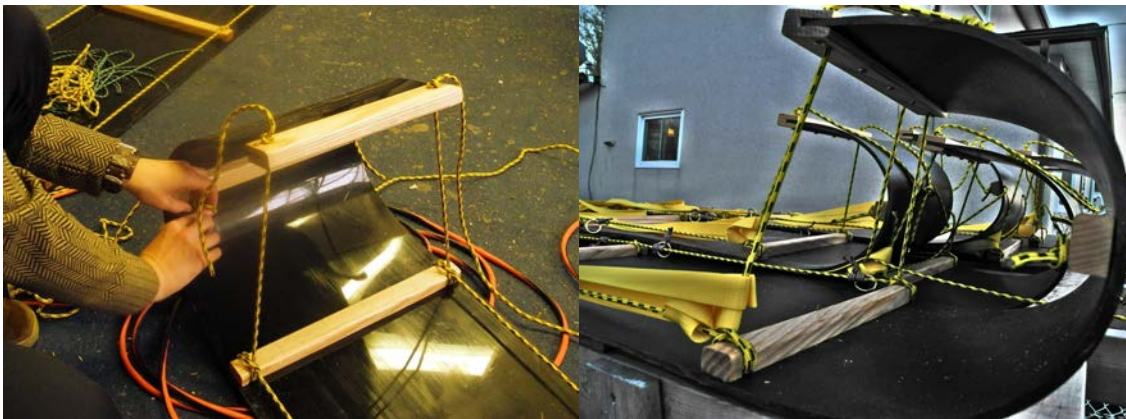


- i. Pass the line over the CB from back to front;
- ii. Pass the line through the CB notch from front to back;
- iii. Pass the line over the CB from back to front, and have the line cross over itself as you do so;
- iv. Pass the line through the CB notch a second time from front to back;
- v. Pass the line over the CB and under itself, so that when you tighten the line it cinches on itself.



*Illustration 12: Clove Hitch on Crossbar*

11. 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.
12. Repeat for the other half of the running line up to and including affixing to CB #3.
13. You will notice that CB # 2 does not have notches, and is not connected to the running line. Instead pass the line directly through the holes that you previously drilled in the HB. While kneeling on the toboggan, pull the hood up and towards you, forcing it into a curl.
14. Tie an overhand "stopper knot" in the running line to hold the hood curl in place (See Appendix).
15. Repeat for the other side to complete the hood.
16. 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 13: Hood Detail - Stopper Knots Illustration 14: Hood Detail - side view*

## 9.0 Finish the Rivet

1. Place your toboggan on a solid surface, with the rivet head on a hard pounding surface (steel, stone, concrete).
2. Place the supplied copper washer over the post of the rivet;
3. Using the supplied rivet setter, drive the washer down over the rivet post, right to the crossbar.
4. Snip off the excess post using a pair of metal snips;
5. Using the ball peen hammer, peen over the remaining stub of the rivet post to seal the washer.
6. Flip the toboggan over, and use the ball peen hammer on the head of the rivet to set it flush with the plastic and reduce drag.

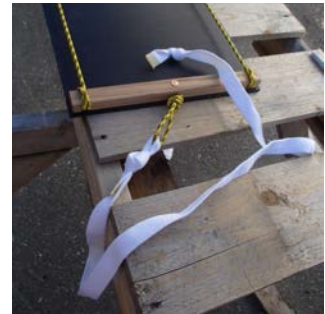


*Illustration 15: Driving the Rivet Washer*

## 10.0 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 16: Brake line.*

## 11.0 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 14 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).

## 12.0 Install Lash System

### 12.1 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.

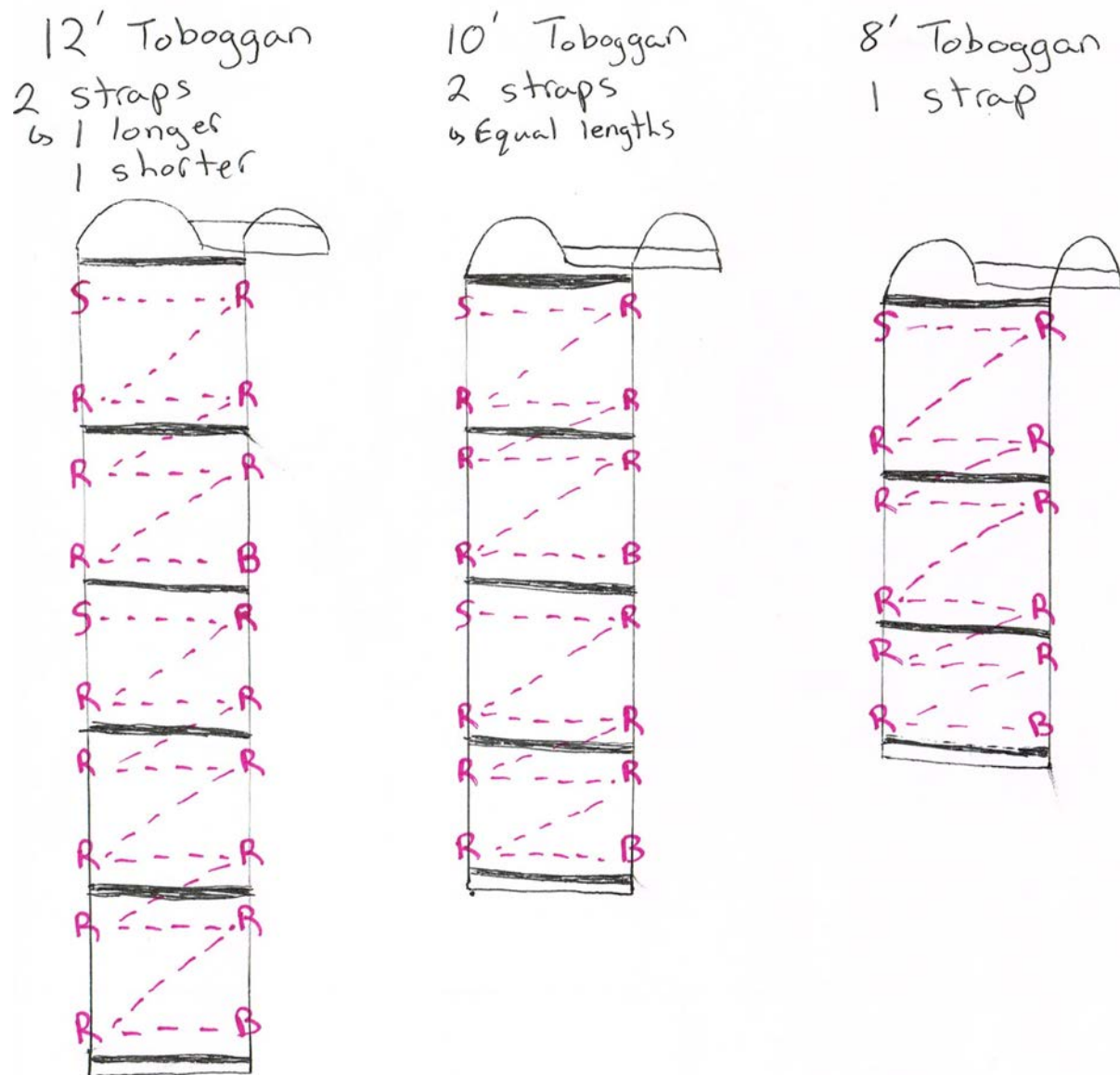


Illustration 17: Toboggan Lash Systems

## 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.
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!

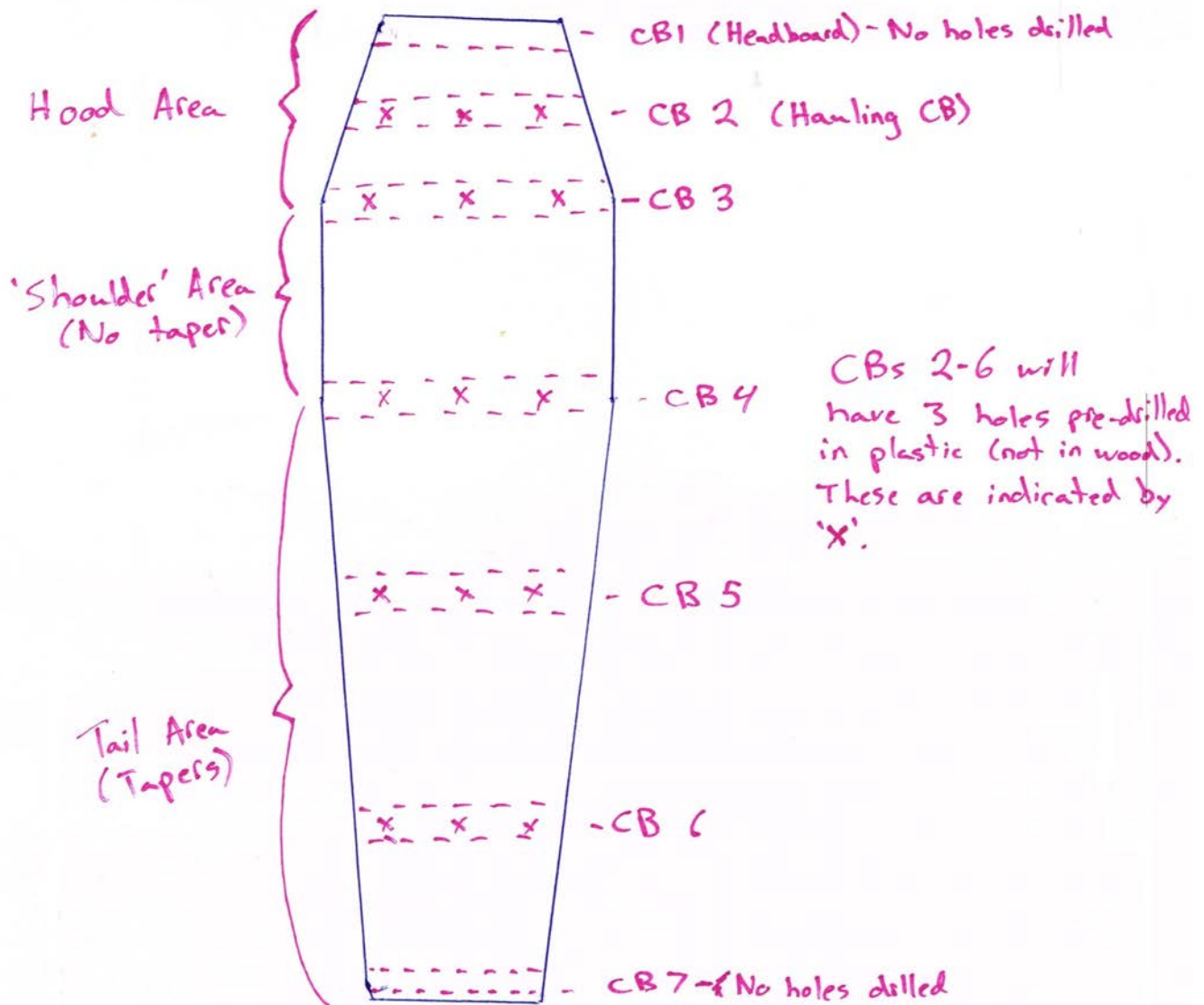
Get out there and use that new toboggan - preferably for multiple days on end!



Happy Crafting!  
[www.lureofthenorth.com](http://www.lureofthenorth.com)

## 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](http://en.wikipedia.org/wiki/Figure-eight_loop)

**Clove Hitch:** [http://en.wikipedia.org/wiki/Clove\\_hitch](http://en.wikipedia.org/wiki/Clove_hitch)

**Overhand Stopper:** [http://en.wikipedia.org/wiki/Overhand\\_knot](http://en.wikipedia.org/wiki/Overhand_knot)

**Water Knot:** [http://en.wikipedia.org/wiki/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](http://en.wikipedia.org/wiki/Taut_line_hitch)

**One-Sided Overhand Bend:** [http://en.wikipedia.org/wiki/One-sided\\_overhand\\_bend](http://en.wikipedia.org/wiki/One-sided_overhand_bend)

**Prussik Knot:** [http://en.wikipedia.org/wiki/Prussik\\_knot](http://en.wikipedia.org/wiki/Prussik_knot)

**Girth Hitch:** [http://en.wikipedia.org/wiki/Girth\\_hitch](http://en.wikipedia.org/wiki/Girth_hitch)

**Double-Fisherman's Knot:** [http://en.wikipedia.org/wiki/Double\\_fisherman%27s\\_knot](http://en.wikipedia.org/wiki/Double_fisherman%27s_knot)