# Ramp It Up!!

## Using rollerski agility ramps to promote discovery, creativity and problem solving

Cross Country Ski Ontario

## A resource guide for coaches on the construction and skill development progressions

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## Background

Most skiers have had some form of exposure to rollerski agility skill-development, mainly in the form of hops, jumps and various version of tight corners. Few skiers, however have had the experience of rolling smoothly through a set of ramps. The US based New England Nordic Ski Association (NENSA) has been manufacturing and using rollerski agility ramps with their skier development programs for several years. Born out of a concern for broken equipment and sore knees, rollerski agility ramps were developed as a way to alleviate potential injuries and teach fundamental skills such as how to pressure a ski in the push phase. The result is a fast flowing, fun and adventurous way to engage skiers of all ages.

## Ramp Construction Fast Facts

- Approximately 80 hours to completion
- Basic carpentry skills required
- Modular design to be dis-assembled and re-assembled for transport
- Painting gives the ramps a nice finished look in your team colours and also protects them to some degree from the weather. A tarp to cover the ramps is also advisable. As plywood takes on water it swells, affecting the long-term service life of the ramps.
- Minimal tools (Skill saw, jig saw, drill, screw gun, orbital sander, caulking gun, flexible metre stick)
- Approximate material costs-1800$
- Your neighbors will ask what you are building. Take the time to tell them all about our sport and how determined we are to enjoy it in the summer heat.

## Materials List

| Quantity | Item | Description |
|---|---|---|
| 5 | 3/8” Good 1 Side (GIS) plywood | Decking |
| 3 | ½” standard spruce plywood | Sidewalls |
| 3 | 825ml PL Premium construction glue | All joints glued and screwed |
| 1 | Jar 500 1-3/4” deck screws | Fastening decking |
| 1 | Jar 400 1-1/2” deck screws | Fastening framing |
| 2 | Spruce 2x8 by 8’ | Centre joists |
| 10 | 3/8” bolts/washers/ wing nuts | Assembly of sections |
| 8 | Spruce 2x6 by 8’ | joists |
| 14 | Spruce 2x4 by 8’ | joists |
| 2 quarts | Paint (Team colours???) | sidewalls |
| 16 | Team logos for sides | Shameless team promotion |
| 1 | Sure Step non-slip paint | decks |
| Various | Brushes/rollers/paint supplies | |
| 1 | Tarp | Cover ramps in the event of rain |

## Key Design Features

The curvature of the ramp is very critical. Too high a peak and the rollerski will bottom out while passing over. After consulting with the New England Nordic Ski Association it was determined a 7” peak height is ideal and will accommodate a wide range of skate rollerskis. Classic rollerskis, with lower chassis will not work on the curvature in this plan. Also worth noting is that rollerskis with excessive wheel wear will also potentially bottom out on the ramps.

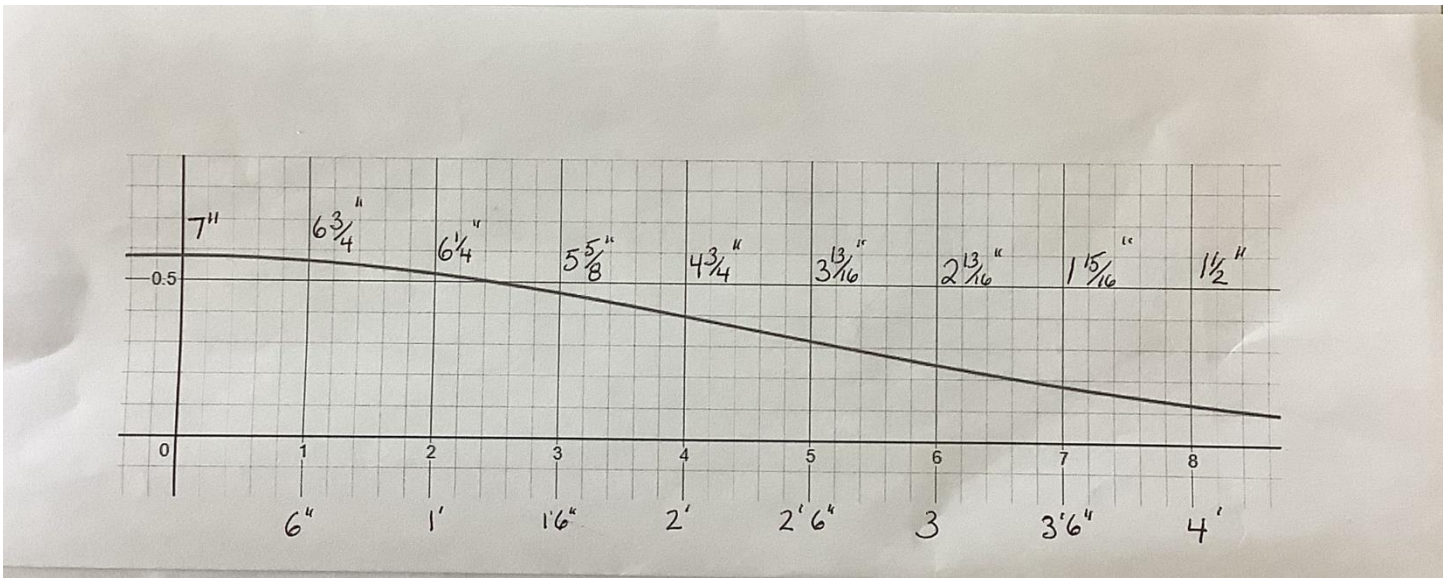


**Figure 1:** Key curvature measurements. Note that this is a 4 foot section only-half the full side wall length.

Using the key curvature measurements in Figure 1 construct a template for the sides of the ramp on a piece of ½" by 8 foot plywood taking care to join the measurement points using a flexible metal metre stick or other suitable flexible straight edge. Be sure to find the midpoint and layout the mirror image of the opposite length of the curve. The end result is a 8 foot length that will be used to layout the rest of the sides of your ramps (Figure 2and 3).

**IMPORTANT NOTE**: 8 of the sidewalls will form the entrance and exit sections to the ramps. The ends of these sections were found to be too high and were later tapered to 1 ¼" inches high to allow the removable entrance/exit ramp to sit flush with the ground. See Figure 4.

**Figure 2:** Using a template to trace the sides

**Figure 3.** Detail of template

**Figure 4.** Ramp Entrance/Exit detail showing reduction of curve end to 1-1/4".

End sections are 24 " long and removable to allow for replacement. They are also painted bright as a visual cue for the athletes.

A 1/2" thick strip of spruce material is fastened midpoint to the underside of the entrance/exit board to prevent the complete collapse of the board under the skiers weight. Some flex is desirable as it allows the board to contact the pavement and bridge the gap in a curved fashion.

The layout of the frame consist of a series of "joists" that bridge the two side walls. The width of the ramp sections is 2 feet. Joists measure at 1 foot 11" to maintain an overall 2 foot width. Start fabricating by placing the central joist. These joists need to be ripped to 7" width (Figure 5). Placement of remaining principal joists is done by placing the 2x6 stock in position where it spans the height of the sidewall, same as for the 2x4 stock. This placement is approximate and varies slightly from section to section (Figure 6). Each section that joins together with another section has a special end piece that is pre-drilled so that the bolt holes are sure to align. (Figure 7.) End pieces are numbered to ensure on site assembly goes in the proper order.

**Figure 5.** Placement of the central joist


**Figure 7.** Connecting end pieces.

**Figure 6.** Placement of 2x6 and 2x4 principal joists. Note that this is an end section. The left side of this section is an entrance/exit. The 2x4 joist is placed on edge to maximize the surface area available to join in the end ramp boards. (refer to previous Figure 4.

Sections are built to fit in a particular order. By doing this one doesn't need to fuss about building identical sections. This is also the case for fitting the decking at the joints. Each one is custom made to fit with the next. This ensures a better fit even though it takes a bit more time to fabricate.

The spaces between the principal joists need to have supports for the decking. The decking should not span more than 6" unsupported. These cross supports don't need to be as substantial. 2x4 material ripped in half or store bought 2x2 material is adequate (Figure 8).

Once the framing is complete then you can lay the 3/8" plywood decking over top. Glue and screw to joists. Note that on each of the 4 entrance/exit sections the decking ends 8 ½" before the section ends. This is the area in which the end ramps are to be fastened (Figure 9). Each end ramp is fitting to each end necessitating another marking. The letter "A" here indicates ramp A fits this section. Most of the fabrication is straight forward but extra care is taken where ever there is a seam.

Start by fastening the decking to the middle joist taking care to ensure that it is square to your framing. As you fasten the decking towards each end the plywood will easily conform to the curvature of the ramp. Wipe away any excess glue and let things cure overnight.

**NOTE:** Due to the nature of the curve, an 8' section of ramp requires a piece of decking slightly longer than 8'. The 2 mid-sections of the ramp require 2 pieces of decking joined with a seam.

**Figure 8**. In-fill joists approximately every 6 inches.


**Figure 9**. End section placement of decking

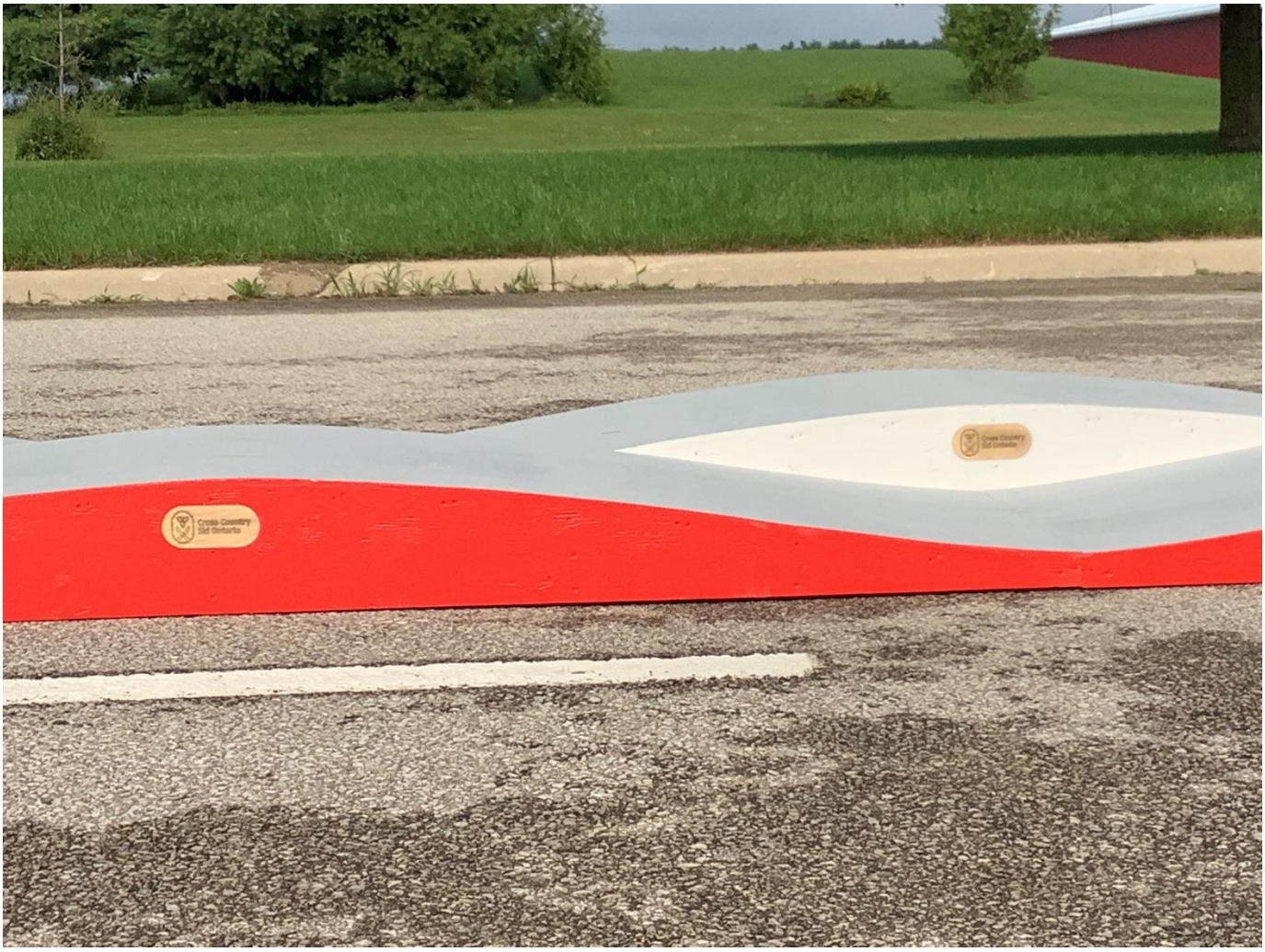

**Figure 10.** Two tone paint job and logos

Finishing consists of a single coat of primer followed by the finishing coats. A two tone colour scheme provides a nice contrast when the ramp sections are assembled (Figure 10.)  Add your club logo!

# Skill Progressions on the Agility Ramps

## Ramp Assembly

Ramps are best assembled on a flat asphalt surface free of debris and with adequate space on each side and either end of the ramps. Assembly of the sections is best done by placing the individual ramp sections on their side, aligning the bolt holes, fastening the bolts snug and lowering the entire 32 foot length carefully to the ground. Three people can easily accomplish this.

Place cones on the entrance and exit of the ramps so that athletes know they are not to be on the ramps until you are ready to start your session.

Rolling through a series of bumps is somewhat of an unnatural feeling on rollerskis. We are used to skiing everything in a linear flat plane. Keep this in mind when introducing athletes to the ramps. A “challenge by choice” approach is often best as it allows the athletes to set their own limits and progress to the next stages when they are ready and confident. Check over the athletes’ equipment carefully. If there is any doubt that an athletes skis will not pass over the ramps, remove the skis and see if they will pass by rolling them over manually. If they bottom out on the ramps then they cannot be used. As previously mentioned, you are more likely to have issues of excessive wheel wear causing skis to bottom out. These ramps will accommodate a wide range of skate skis.

## Key Instructions for Athletes

- No poling on ramps. Poling will damage the decks and is not necessary. Having the athlete experiment with the critical speeds needed to travel the ramp distance is part of the learning. Athletes will eventually understand how to “pump the bumps”, pressuring the skis at the right time to maintain momentum.
- Poles must stay behind body. A pole jammed out front will have the potential to come back into the athletes face or body with the potential for injury
- Athletes must enter and exit the ramps in a straight line. Do not attempt to enter the ramps from an angle. Set cones out to encourage a straight pathway to the ramps.
- Until athletes are very comfortable with the ramps, only allow one athlete to pass through the entire length before allowing the next athlete to enter.
- An athletic stance is critical. Demonstrate the necessity for flexed knee and ankle joints to absorb the bumps.
- Never allow athletes to pass on the ramps in opposite directions. Too much potential for a collision.
- As with all rollerski activity- helmets and eyewear are a must.

## Progression 1: Single Leg on Ramp

Having one leg on the ramp and another on the pavement allows the athlete to experience the sensation of flowing over the ramp while having a solid base on which to place most of their body weight. Some re-direction of the non-ramp ski may be necessary to maintain a straight trajectory. If skis drift apart and the athlete feels they want to abort the ramps they can simply lift the ramp ski off and peel away from the ramps safely. For this reason this is considered a good first step on the ramps.

As skiers become more comfortable they can start to pressure the ski on the downslope of the ramp. Be aware that excessive “pumping” in the single leg position can generate considerable rotational forces that must be controlled by the athlete. Athletes will also need to experiment with the speed at which they enter the ramps in order to flow through the entire 32 feet.

Some skiers find this progression the most difficult of the three.

## Progression 2: Two Legs-Same Side

Some skiers will find it much easier to travel through the ramps in this position as it is one that is very stable and familiar to a skier. Have skiers approach the ramp in the direction of travel and take their last pole plants well before entering the ramps. Encourage that athletic stance, knees and ankles flexed, and hands out front in a “ready position”. If a skier lacks the momentum to fully complete the distance have them carefully step off to the side and try again next pass through. Remind athletes not to pole or try to take skating strides on the ramps to increase their forward speed. Any increase in forward speed must come from “pumping the bumps”, pressuring the skis on the downward slope.

## Progression 3: Bicycle Pumps

This is the most dynamic and fast-flowing of the three progressions.  Once the athletes have mastered this progression it will quickly become their go-to choice. By now the athletes have a good understanding of when and how to pressure their skis. This progression builds on this, adding in more coordinating movements between arms and legs.  Once the athletes become confident at this progression then increasing speed becomes the limiting factor.

## Acknowledgements

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For further Information, Support and Guidance on building ramps for your team/club contact:

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