Boeing Employees Alpine Society
Ice Climbing Seminar

Overview

This document provides additional useful information to help with the BOEALPS ice climbing seminars.

Equipment Preparation

Sharpen Tools, Crampons and Screws:

It is important to keep your tools sharp. Sharp tools bite hard ice better and create less stress fractures and shattering in brittle ice. They also help you to conserve energy. All tools should be sharpened using a hand file, grinders can overheat the metal and weaken it. Don't sharpen your tools or crampons until you know how. Improperly sharpened tools may be weakened or difficult to use.

Adjust Wrist Leashes:

Proper sizing of wrist leashes is very important for ice climbing. An improperly sized leash can render your ice axe virtually useless. Attach a long wrist leash on your standard alpine axe and ice tools so that your hand grasps the end of the shaft when fully weighted. To aid in vertical climbing, the wrist leash should be either wrapped around the shaft or be taped to the shaft just above the hand. You also need to be able to get out of your wrist loops, preferably with one hand, so that you can place screws while on lead. There are many different ways to tie a wrist leash to your ice axe. Try several methods and decide what works best for you. Some of the newer water ice tools have detachable leashes that negate the need to remove the leash from your wrist. The latest trend in water ice and mixed climbing is to use tools with radically shaped shafts and without leashes. These leashless tools have limited application in the alpine world.

Fit Crampons to Boots:

Make sure crampons fit properly before the outing. On easy terrain it can be frustrating to have crampons that keep popping off your boots. On difficult ice it could be disastrous.

- Make sure crampons stick to boots even when unattached.
- Heels should not pop out of the back of crampons.
- Toe straps should not slide off the toe of the boot.
- If using clip-on bindings make sure they fit snugly to the boot.

Climbing Techniques

French Technique:

French Technique, also known as flat footing, uses the thigh muscles and relies on flexibility and balance. Very experienced climbers in French technique can negotiate slopes of up to 80° however most climbers' abilities are limited to slopes of 60° or less. All ten crampon points must penetrate the snow, no edging! Keep ankles loose. A standard length Ice Axe of 70 cm or more is preferred for French Technique.

Crampons:

Pied Marche (0-15°)

"Walking" or marching on level ground.

Pied en Canard (10-25°)

"Duck Feet". Splay toes outward as angle steepens.

Pied à Plat (20-50°)

"Flat Footing". Turn sideways as the angle steepens and point toes more and more down hill. Stomp feet for security and allow ankles to roll so all ten points sink into the ice. Knees apart and away from slope.

Pied Assis (40-80°)

Sit on heel of outward foot. Other foot at about 3:00 o'clock position. Spread knees apart.

Ice Axe:

Piolet Canne (0-40°)

"Cane" position. Pick forward.

Piolet Ramasse (35-50°)

"Cross Body" position. Place axe horizontal, at waist level, and with pick forward. Outer hand on head and inner hand on spike. Don't lean on spike, use for balance.

Piolet Ancre (45-80°)

"Anchor" position. Swing pick into ice, then grasp head with other hand.

German Technique

German Technique, also known as Front Pointing, uses the calve muscles and is very tiring. It is used on slopes ranging from 50° to approximately 115°.

Crampons:

Front Point (50-115°)

Place front points normal to surface, don't splay feet. Keep Heals low. Don't kick too hard.

Pied Troisième (50-90°)

"American" technique. One foot pied à plat while other front points. Helps reduce fatigue on long pitches.

Ice Axe:

Piolet Panne (50-65°)
: "Low Dagger". Also known as "Crabbing". Tools at waist level, pick forward and against ice. Negative clearance picks on hard ice wont work. Can move fast.

Piolet Piognard (60-80°)
: "High Dagger". Hands on heads of tools, pick forward, and tools placed above head. Only works on soft ice or hard snow.

Piolet Ancre (45-80°)
: Same as for French Technique.

Piolet Traction (50-115°)
: Classic Front Point axe position. Hands on shaft just above spike and pick whacked into ice. Don't power grip shaft.

Descending Techniques

Down Climbing

It is often safer and quicker to down climb than it is to rappel. Everyone should practice down climbing what they climb. This may mean down climbing into a crevasse before climbing out.

Crampons:

Pied Marche (0-35°)
: Point toes down fall line. Don't rotate feet as slope steppens.

Pied en Canard (20-40°)
: Bend and spread knees. Lean forward.

Pied à Plat (30-60°)
: Feet pointed diagonally down; body sideways. Knees spread and bent.

Front Pointing (40-90°)
: Same as climbing up, however, moves are reversed.

Ice Axe:

Piolet Canne (0-40°)
: Pick facing out.

Piolet Ramasse (35-50°)
: Axe off to one side.

Piolet Appui (40-55°)
: "Support" position. Pick and spike resting on snow for support.

Piolet Rampe (40-60°)
: "Banister" position. Plant pick below. Pull outward on shaft. Slide hands down shaft as you descend. Won't work with reverse curve picks.

Front Pointing (40-90°)
: Same as climbing up however moves are reversed.

Ice Technique Summery

French Technique up to 60°	**German Technique** up to 90°+
Crampons	**Crampons**
Pied Marche (walking)	Front Pointing
Pied en Canard (duck feet)	Pied Troisième (3 o'clock / American Technique)
Pied à Plat (flat footing)	
Pied Assis (assist or rest position)	
Ice Axe	**Ice Axe**
Piolet Canne (cane)	Piolet Panne (Low Dagger)
Piolet Ramasse (cross body)	Piolet Piognard (High Dagger)
Piolet Ancre (anchor)	Piolet Traction
Down Climbing Axe Position	**Down Climbing Axe Position**
Piolet Canne	Piolet Panne (Low Dagger)
Piolet Ramasse	Piolet Piognard (High Dagger)
Piolet Appui (support)	Piolet Traction
Piolet Rampe (Bannaster)	

Technique Tips

Front pointing:

- Place crampons thoughtfully: like rock climbing, careful placement of the feet is most important
- Set swift and decisively: half-heartedness will lead to shattering and shearing. Unless you're kicking into a solid piece of soft ice, it can take two or three kicks to solidly seat your crampons.
- Strive for minimal boot movement after placing
- Drop heels slightly to rest calves

  Because crampon pts are *below* your boot, drawing entire leg back tends to bring toe of boot into contact with ice; instead, swing your lower leg from the knee.

Placing Tools:

Practice placing tools at ground level.

- Use the Power Throw
    - Uses larger muscles of shoulder and chest rather than arms.
        1. Select 5x5 cm target
        2. Remove tool
        3. Drop tool over shoulder like scrub brush for your back (upper arm sticks out to side at 90 degrees)
        4. Focus on target – mark with an imaginary X
        5. Contract shoulder muscles, cocking the throw
        6. Contract pecs, triggering the throw (draws upper arm forward)
        7. Flick wrist quickly as the arm fully extends, snapping pick perpendicularly into the ice
        8. Pull down forcefully on shaft as pick makes contact

- Experiment and Ask
    - How does placement feel?
    - How did it sound?
    - How much outward pull can tool take before popping pick out?

- Concentrate when tired
    - When you're tired and pick bounces off, concentrate on keeping tool in plumb line with your hand, elbow, and shoulder

- Look for secure, low energy placements
    - Use partner's holes when following, your own when descending
    - Depressions shatter less than bulges
    - White ice is newly formed and often brittle; better ice often underneath
    - Green/Blue Ice is older: clear, dense and hard
    - Black Ice is very old and and extremely tough; often found in gullies

- Watch for Dinner Plating
    - Ice fractures w/ a distinct "whumpf" and turns opaque white
    - Can slide off in a big plate
    - Cold brittle ice is prone – also bulges
    - Break up into smaller pieces
    - Look for better ice (usually underneath)
    - Don't move up on a dinner plate tool placement or place crampons into

- Avoid stuck tools
  - Stuck tools are a product of overdriving them
  - Find the fine line where tools are solid but they clean easily
    1. Grasp shaft just below head and gently wiggle up and down
    2. Push straight up
    3. Upward rap w/ heel of hand under adze or hammer will pop out obstinate tool
  - DO NOT wiggle side to side – likely to break pick

Moving Up, Down, & Around:

Practice movement through "bouldering" on ice

Basic Technique: the X Position:

1. Lay back off tools straight armed with grips relaxed (wristloops are taught)
2. -your back bears your weight, not your forearms!
3. Sink down and thrust butt out
4. Look down, dropping head between arms
5. Push off one leg, and draw other up
6. Pivot from knee and strike
7. Test placement by weighting briefly
8. Work feet up until under butt
9. Stand up straight, butt in to place weight on your feet
10. Remove poorer placed tool and set at near arm's length. Follow with second tool, placed a couple feet away from first tool to avoid blowing it out.

A Better Technique: Tracking:

With this technique you climb with the tools staggered, ideally with your lower arm not bearing weight and the upper arm straight, holding some weight. The most tiring thing in ice climbing is placing, or perhaps removing, the ice tools. With Tracking, the vertical distance between tool placements is less than when using the X position; however, you are only placing one tool for each move you make upwards, which saves a lot of energy. The sequence is:

1. Start in the X position, then after standing up to where the tools are near your armpits, remove a tool and place it near arm's length above.
2. Make small, alternating steps up with your crampons to where your feet are now about where your calves were before. If possible, your feet should end up level.

3. Loosen the lower tool but do not remove yet. Look and decide where you will place it above.
4. Stand up tall on your feet, removing the lower tool and immediately driving it in above where you scouted.
5. Test the placement then rest on a straightened arm and relax the lower arm.
6. Repeat Steps 2 through 5.

Saving Energy:

Always strive to move efficiently. Small steps are easier to make than large ones. Relax your grip whenever possible. Employ the same type of active rest you do in rock climbing. Look for low energy tool placements: hooking an icicle or cauliflower, reusing a pick hole, being selective where you will place the tool.

Conquering Bulges:

1. Avoid desire to strike for back with pick
2. Work feet up high while incrementally moving tools back
3. Swing tool down hard, flipping spike up and yanking bank upon impact
4. Lay back on placements and walk feet up to within a high-step of crest
5. Remove one crampon and place on top, striking down hard
6. Advance one tool, then the other foot

Downclimbing:

- Place each tool into previous hole using abrupt cleaver-like throw
- Sink down as your arms straighten

Traversing:

- Place tools at 45 degrees
- Stay well below tools (straight arms)

Placing Protection, Setting Up Anchors, and Leading

Types of pro:

- Ice Screws (modern, high profile threads)
  - various lengths
  - Best pro in good ice
- Pound-in Screws

  - Old
  - Not used much any more, can be difficult to remove
- Ice hooks
  - Used in thin ice, may hold body weight
  - Will not hold a long leader fall
- Ice Tools as pro
  - Will not hold long fall
  - May back up questionable screws
- Natural pro –
  - Icicle tie offs, trees
  - May be the best and quickest form of pro
- Rock pro
  - Pitons, nuts, cams, bolts
- Load limiters
  - Yates Screamers –
  - Help dissipate energy of a fall

Placing Pro, General:

1. Look for easy stance
2. Look for easy pro: rock, natural features such as horns or icicles
3. Chop a ledge, if necessary, so you can flat foot w/ one boot
4. Have a system worked out
   a. Crook one arm through leash
      i. Fast but awkward
      ii. Only hanging from one tool
   b. Use Daisy Chains to hang from both tools
      i. Slower but easier
      ii. More secure
      iii. 3rd Tool is useful to aid in placing screw
   c. Hang from one wrist leash and place single-handed
      i. Fastest but most tiring
      ii. Susceptible to losing a tool

Placing Ice Screws:

1. Set at waist level – more leverage
2. Clear off enough surface ice on first time
3. Make small pilot hole with pick
4. Be attentive – suddenly becoming easier indicates air pocket
5. Angle screw 10-15° below horizontal (screws strongest in tension, not shear)
6. Drive all the way or tie off

Removing Screws:

To clean core ice gently tap screw (not threads) and/or blow through from *sharp end* to work with the taper. If you can't clean ice, place the screw in your jacket to help melt. You won't be able to place a screw that has ice bonded within its core.

Considerations When Leading:

- Ice pro is often dubious
- Follow "Don't Fall" mantra
- Mitigate with rope choice, using two ropes. Can use load limiters (Screamer)
- Bring a small rock rack and some pitons
- Carry a 3rd Tool
- Consider using runaway or "idiot" straps to prevent a lost axe

Building Anchors:

- Hang from two tools if you must
- Look for bomber pro: min. 2 good pieces
- Set screws a couple feet apart to avoid fracturing and failure of both; offset vertical alignment is best
- Equalize

Anchor Types:

- V-Thread
  - Form equilateral triangle using two intersecting screw holes drilled into ice (the space between them on the face of the ice is the third side)
  - Thread with cord or webbing and tie off
  - Can be very strong in good ice but don't hesitate to use two and equalize.
  - Backup with an ice screw until the last rappel
- Bollard
  - Form tear drop shape
  - In cut lip
  - Cut at least 4-6" deep in ICE
  - Make at least 18" long
  - Wrap with slip-knotted webbing

References and Acknowledgements

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- Climbing Ice by Yvon Chouinard
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