



Alpine Ice Climbing

Kitsap 2023

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Agenda

- References
- Characteristics of Ice
- Objective Hazards
- Safety and Speed
- Efficiency
- Clothing and Gear
- Hardware and Software
- Anchors
- Movement on Ice
- Mount Baker North Ridge Example
- Mount Hood Leuthold Couloir Example
- Mount Angeles Example



References

- FOTH, 9th Ed. Mountaineers Books. Read chapter 19.
- Ice & Mixed Climbing – Modern Technique, Will Gadd, 7th printing 2017 (Second edition of this book coming sometime -overdue) Mountaineers Books. Read chapters 1-5.



Characteristics of Ice

- Ice formed directly from water freezing; or indirectly through metamorphosis of neve (permanent snow). Ice is distinguished from hard snow when its mass is airtight.
- Opaqueness denotes softness. Soft, plastic snow can lead to good tool placements; too soft and weak can lead to weak protection.
- Color indicates hardness. Blue ice (relatively pure) vs black ice (old, hard ice mixed with dirt, debris)
- Clarity equals brittleness (can require extra time to plant a tool without ice shatter –choice of point to strike with axe: convex vs concave surface)
- Cracks and fractures can mean weakness
- Dinner plates mean temperatures are changing (tends to happen later in day as air warms), surface of ice becomes softer and more aerated - breaks away in plates
- Concavities vs convexities – where strike with the tool?



Ice Grades

- WI 1: Solid, thick, low-angle ice easy to climb with 1 ice tool and 10-point crampons
- WI 2: Rambling pitch of low angle ice...
- WI 3: Up to body length of near-vertical ice and longer stretches of 60-degree ice.
- WI 4: Short bit of vertical ice or a longer pitch of 75- to 80-degree ice
- WI 5: Long pitch of solid, vertical ice or shorter vertical/funky ice; reliable screws/belays difficult to find
- WI 6: Overhanging mushrooms/bad gear; free-hanging daggers, very strenuous roofs
- WI 7/8: Harder yet...

See Gadd, pp. 84-86



Objective Hazards

- Loose rock & hidden ice on approach
- Falling ice and rock
- Avalanche condition / weather
- Ice quality
- Altitude
- Crevasses...

Safety and Speed

- Speed/efficiency improves safety
- Time: clock ticks whether you are moving or not; party size and #ropes matter
- Ice trips have limited forgiveness of error, stronger potential for injury
- Route finding is important
- Know when to turn back – or if you can turn back
- Simul climbing vs belayed pitches

Efficiency

- Desire to move faster
- Know the weather
- Memorize ascent/ descent routes – **recent** beta often key
- Early starts absorb contingencies
- Steady pace – no/few breaks; eat at the belay station
- Let the strongest lead all the way through, or block lead
- “Draft” by hooking leader’s pick holes, to save time & energy
- Eat & drink frequently to save energy- carry warm drinks instead of brewing
- Carry light packs and be strict about contents

Clothing and Gear

- Warm (enough), fitted clothing – **extra** gloves
- Sunscreen, sunglasses
- Climbing helmet
- Stiff mountaineering boots – leather or plastic depending on temperature; rands front and rear to support fully automatic crampons
- Gators
- Harness – make sure yours works with the pack you are wearing
- Cordelette – you decide; will likely not use it
- Standard glacier travel gear – prusiks on the rope not a given
- 10 essentials

Hardware

- Sharp 12-point crampons – consider vertical front points (get a file)
- Ice axe
- Second ice tool or two tools
- Leashes (optional, in my opinion)
- Ice screws of appropriate length; often longer for alpine ice
- Pickets (almost always two per person or more)
- V-thread tool – spend a few bucks and get a real one!

Ice Tools

- Steep ice 45° and up: hybrid axe – like a general ice axe with bent handle
- Extremely steep 60° and up – bent-grip shaft tool (Petzl Quark is a common model)
- Vertical ice – ergonomic grip often used – Petzl Nomic or Ergonomic are common
- **T** vs **B** rating – critically important that your tool have T rating
- Modular head useful for tailoring your axe for the climb – hammer/adze/nothing
- Weight the head or not?
- To tether or not? Yes to start, in my opinion

B vs T Rating

EN-13089	ICE TOOLS (Axes and Hammers)	UIAA-152
<p>This representation does not provide full details. Read the Note at the head of page 1. © UIAA, Pit Schubert, Neville McMillan, 2009</p>		
<p>Fatigue tests only for type T</p> <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>flat picks</p> <p>minimum 50,000 cycles between the values +80 N and -80 N, as shown</p> </div> <div style="text-align: center;"> <p>half tubular picks</p> <p>minimum 12,000 cycles between the values 0 and +80 N, as shown</p> </div> </div> <p>*) For all these tests: If the shaft of the ice tool is not long enough for the distance as drawn, shorter distance can be used with corresponding increases in the applied loads, to generate the same bending moment</p>		
<p>Additional UIAA requirements</p> <p>Ice tools shall have, either</p> <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>(a) an attachment device, intended for attachment to the user's hand (hand loop) or body or</p> <p>(b) at least one hole in the head or shaft of the ice tool, for attaching a sling. If this hole is in the shaft,</p> </div> <div style="width: 45%;"> <p>it shall be situated in that half of the ice tool that includes the head. All holes shall be free from sharp edges or</p> <p>(c) both (a) and (b)</p> </div> </div>		
<p>Static tests</p> <p>Longitudinal test for type B and T</p> <p>If an ice tool has a hand loop, the hand loop shall be tested</p> <p>Designed by Georg</p>		

EN-13089	ICE TOOLS (Axes and Hammers)	UIAA-152
<p>Note: This representation of EN 13089 and UIAA 152 does not contain the full details of the test method and requirements in these standards; it gives only a simplified pictorial presentation. For full details, EN 13089:1999 and UIAA 152:2008 should be consulted. © UIAA, Pit Schubert, Neville McMillan, 2009</p>		
<p>With regard to strength, two types of ice tools exist in accordance with these standards:</p> <p>Type B = Basic type, with lower strength, for use in general circumstances as on glacier, for snow hiking, for ski mountaineering etc.</p> <p>Type T = Technical type, with higher strength, for use in all circumstances especially for ice climbing, dry tooling etc.</p> <p>Shafts and picks shall both be marked with the symbol of the type in a circle as shown</p>		
<p>Static tests</p> <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>F for type B 0,6 kN F for type T 0,9 kN</p> </div> <div style="text-align: center;"> <p>Tape (see view A)</p> <p>View A</p> <p>F for type B 2,5 kN F for type T 4,0 kN</p> </div> </div> <div style="display: flex; justify-content: space-around; margin-top: 20px;"> <div style="text-align: center;"> <p>only for flat picks</p> <p>F</p> <p>330 mm</p> <p>25 mm</p> </div> <div style="text-align: center;"> <p>only for flat picks</p> <p>F</p> <p>330 mm</p> <p>25 mm</p> </div> </div> <div style="text-align: center; margin-top: 20px;"> <p>F for type B 2,5 kN F for type T 3,5 kN</p> </div> <div style="text-align: center; margin-top: 20px;"> <p>F for type B 127 N F for type T 182 N</p> <p>permanent deformation at the point of load after loading max. 70 mm</p> </div> <p>for all these tests see *) on page 2</p> <p>Designed by Georg</p>		

Hardware and Software


- Tool clips/holsters
- V-thread tool
- Load limiting protection (“Screamer” – Gadd recommends; used less now per Canadian Guides)
- Gloves – multiple pairs (keep spares in your “heater”)
- Pitons (I have not had occasion to use them so cannot speak to them)

Anchors

- Ice Screws – see placement: Gadd, p. 100
- Pickets
- Abalakov /V-thread/A-thread/0-thread
- Ice bollard



Anchors

- Abalakov Anchor 
- V-Thread/A-Thread Orientation (A shown)
- Will be **backed up** with ice screw/runner for all rappelling; back up removed for last person after the anchor has been proven adequate



Belay Anchor Example

- Two ice screws generally adequate
- Can use three if more than 2 people will be on the anchor or you question quality (Gadd, p. 107)
- Fixed Point Anchor →
- Backup with tool if desired



Movement on the Ice

Gadd, pp. 84-86 on
Ice Grades useful:
WI Grades/Alpine
Grade/M Grades

Climbing in
balance

Tool work – the
swing; weighted
tool or not?

Team composition
and party size

Crossing ice
bridges

Running
belay/simul
climbing vs pitched
climbing

Swing leads

Learn French

Crampons

- Walking (French; pied* marche)
- Duckwalk (French; pied canard)
- Flat-footing (French; pied à plat)
- Rest position (French; pied assis)
- Three o'clock position (American; pied troisième)
- Front pointing (German technique)

*Pied "pee-EY" = foot

Steepness of Slope

Gentle, 0° to 15°

Gentle, 15° to 30°

Moderate to steep, 30° to 60°

Extremely steep, 60° and higher

Extremely steep

Steep thru Vert/overhanging

Learn French

Ice Axes and Ice Tools

- Cane position (piolet* canne)
- Cross-body position (piolet ramasse)
- Anchor position (piolet ancre)
- Low-dagger position (piolet panne)
- High-dagger position (piolet poignard) Steep, 50° to 60°
- Traction position (piolet traction)

Steepness of Slope

Gentle to moderate, 0° to 45°

Moderate, 30° to 45°

Steep to extremely, 45° and up

Steep, 45° to 60°

Extremely steep thru vert/over, 60°+

*Piolet “pee-oh-LAY” = ice axe



Mount Angeles



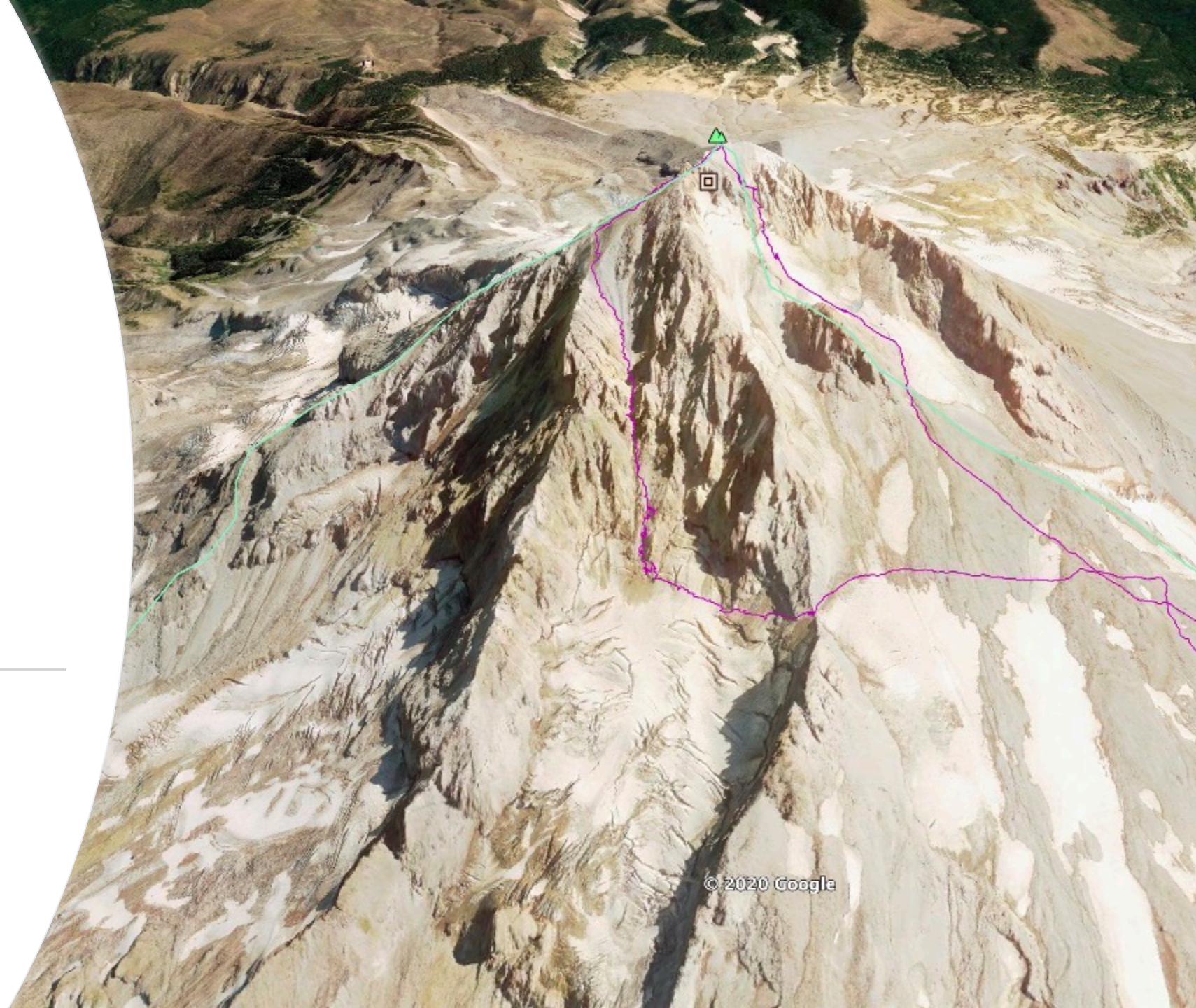
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Mount Angeles





Mount Hood Leuthold Couloir





Mount Hood Leuthold Couloir



Mount Baker North Ridge



North Ridge

- Onto Hourglass Couloir (Left)
- Marko leading step (Right)



North Ridge

- Ridge Proper (Left)
- Leading ridge (Right)



Activities Tonight

- Intro and this brief: 7-7:40
- View/explain Gear: 7:45-8:00
- Demo THE TRIANGLE 8:00-8:15
- Swing lead sequence practice in 2-person teams: 8:15-9:00
- Practice one-handed clove hitch on carabiner 10x each: 8:15-9:00
- Final questions/depart 9:00 to finish