

# SMC SNOW, ICE AND GLACIER CLIMBING LEVEL 3 TRAINING COURSE SYLLABUS

## SIG 3.1

Reference: Mountaineering: The Freedom of the Hills, 8<sup>th</sup> Edition, The Mountaineers, Seattle WA

### ORIENTATION

Meet and Greet Activity

SIG 3 Learning Objectives:

- Refine skills from SIG 1 and SIG 2
- Add to existing core knowledge
- Learn technical skills for more advanced terrain
- Cultivate expedition behavior (p. 470)

### SAFETY AND OVERVIEW

Managing Risk (p. 485-494)

- Make good decisions (p. 492-494)
- Experience and judgment (p.15, 486)

### ORIENTATION AND SAFETY

- Packing appropriate gear and clothing (p. 406-414)

- Orientation to area, topography, considerations
- In case of emergency – medical training, first aid
- Approach and descent considerations

### WATERFALL ICE CLIMBING TECHNIQUES (p. 405-455)

On ice explicitly demonstrate and practice the following techniques on top rope:

Footwork in crampons (p. 416-424)

- Pied troiseme (p.424-425)
- Front pointing (p.416, 421-422)

Tool Technique (p. 425-432)

- Piolet panne – “low dagger” support over adze
- Piolet poignard – overhead “high dagger”
- Piolet manche – “low dagger” below head
- Piolet ancre – “anchor” (p. 423)

- Piolet traction – hanging and front points (p. 423, 426-427, 441-444)
- Hooking, torqueing, stein puller, lieback (p. 450-453)

Piolet Traction Technique Refinement (p. 423, 426-427, 441-444)

- Tips for placement of tools (p. 425-426)
- Parallel tool progression: swing, swing, kick, kick
- Alternating tool progression: swing, kick, kick, center under tool. (p. 426-427)
- Monkey hang technique (p. 444)
- Minimize amount and force in swings and kicks
- Steady feet, drop heels
- Hips in, knees bent

Descent (p. 428-430)

- Downclimbing – facing in (p. 430)
- Lowering or rappelling (p. 439)

## SIG 3.2

### PLACEMENT AND ASSESSMENT OF ALPINE AND WATERFALL ICE PROTECTION

- Principles of placing protection (p. 430-436)
- Ice screws (p. 432-433)
- Placing ice screws (p. 431-433)
- V-Thread (p. 434-435)
- Ice Bollard (p. 435)
- Pitons, rock gear and natural protection also possible (p. 169-172)

### MULTI-POINT BELAY ANCHORS OVERVIEW

Forces Inherent in Rock Climbing (p.157-159)

- Dynamic vs. Static forces
- Ropes: Diameters, UIAA Falls, Impact force
- Kilonewtons: carabiners vs. protection vs. slings
- Angles and forces (p.176-178)
- Common failure points discussion

Assessing Anchors: SERENE and EARNEST (p.170)

- SERENE = Solid, Equalized, Redundant, No Extension
- EARNEST = Equalized, Applicable, Redundant, No Extension, Solid, Timely

Solid

- Maximize contact and angle of loading
- Maximize features of the anchor pieces
- Utilize highest quality ice or natural anchors available
- Assess collective strength of anchor
- "Minimum" pieces for a strong anchor
- Discussion: How strong is strong enough?

Equalized (p.172-178)

- Dynamic / Self-equalized / "Magic X": unlimited sliding equalization, but potential for extension and shock loading (p.174-176)
- Static / Pre-equalized / Figure 8,9,10: pre-equalized in a single direction only, but protected against extension and shock loading (p.172-174)
- Hybrid: limited sliding equalization and limited protection against shock loading (p.176)

Redundant

- Limit single point failure potential
- If you aren't sure...then you are sure (you need a backup)
- Ability to monitor the anchor affects redundancy choices (e.g. top roping)

- Ask the question, "what if..." then build accordingly

No Extension

- Discussion: Why do single point anchors "blow out?"

- Understanding and preventing shock loading

Additional Factors from EARNEST

- Applicable: the best choice given the needs of the situation
- Timely: in the correct location, quick to build and take apart

Rigging

- Using a cordellette
- Using slings
- Using the rope
- Hybrid rigging

**DEMONSTRATE AND PRACTICE BELAYING** (p. 436-439, 155-187)

- Principles of lead belaying on single or double ropes
- Direct vs. harness belay (p. 437)
- Belay device vs. munter hitch vs. hip wrap (p. 160-168, 437-438)
- Rappelling (p. 439, 188-207)

**SINGLE PITCH LEAD CLIMBING WITH TRANSITION PRACTICE**

Rope teams practice full lead climbing from the ground up on selected routes, complete with building a multi-point anchor and bringing up the second. Then they will work through the transition - what will

they do next if they were to continue climbing from that point? Then lower, rappel, or walk off, depending upon need and time constraints. Switch roles and repeat.

**SIG 3.3**

**ORIENTATION AND SAFETY**

- Packing appropriate gear and clothing (p. 406-414)
- Orientation to area and considerations
- Safety and safe zones from icefall and falling tools
- Approach and descent considerations
- In case of emergency

**MULTI-PITCH ICE LEAD CLIMBING SKILLS OVERVIEW** (p. 454-455)

Principles and considerations

- Climbing with a "self-belay" mindset
- Running belays vs. fixed belays

Team Tie-in, Options

- Team of 2 vs. team of 3
- Rope length, diameter and type selection
- Single, Double, or Half Ropes
- Kiwi coil (p. 257)

Multi-Pitch Lead Climbing Sequence:

1. Know the route (p. 262-263)
2. Establish personal safety at the best location
3. Establish anchor (SERENE, EARNEST)
4. Stack the rope
5. Establish the belay
6. Visualize the ascent: route, hazards, considerations (p.264)
7. Select types and amounts of protection and equipment (p.258)
8. Communication / signals (p.183)
9. Protect the belay (p.159, 264)
10. Lead route placing intermediate protection (p.264-270)

Racking options and techniques

- Harness gear loops / pack
- Gear slings and options
- Hybrid

Racking Procedures

- Protection
- Quickdraws, single and double slings
- Cordellettes
- Carabiners

Protecting the Belay (p.264)

Protecting a Traverse

Clipping Technique (p.265)

Discussion: Decisions to make in placing protection

- How often should I protect?
- Where on the route should I protect?
- Is it "good enough" to withstand maximum forces here?

On-Route Considerations For Leaders (p.264)

- Current likelihood of a fall
- Consequences of a fall
- Protecting cruxes and traverses (p.268)
- Judging direction of fall forces (p.267)
- Avoid a pendulum (p.269)
- Time being consumed vs. time allotted
- Fall factors
- Ice quality and available features
- Aesthetics of the experience

Cleaning The Route (p.271)

- Know your responsibilities and do it as quickly as possible
- Retrieve gear carefully and quickly
- Rack the gear to facilitate transfer

Passing a Knot

**TRANSITIONS**

Discussion: Why is this such a critical point?

Factors at the transition between pitches:

1. Transferring the rack
2. Transferring the belay
3. Transferring the lead
4. Modifying the anchor for an upward pull
5. Transitioning to a lower or a rappel
6. Need for physical / psychological rest
7. Need for water / food / clothing
8. Need for information or decision making

Solutions:

1. Transferring the rack: decide and use the most effective method as a team
2. Transferring the belay: build it so no modification is needed, or it can be done in less than 30 seconds
3. Transferring the lead: One leader only, or lead in blocks. If you must swing leads, practice the transition
4. Modifying the anchor: build a multi-directional anchor
5. Transitioning to a lower or a rappel: practice

before attempting the route

6. Need for physical / psychological rest: better mental and physical training
7. Need for water / food / clothing: climb within limits and within flexible systems that can be "adjusted on the fly"
8. Need for information or decision making: study the route beforehand, use radios, and make decisions before starting the route

**MULTI- PITCH ALPINE ICE LEAD CLIMBING SEQUENCE**

**1: SINGLE PITCH LEAD CLIMBING**

Rope teams practice full lead climbing from the ground up on selected routes, complete with building a multi-point anchor and bringing up the second.

**2: MULTI-PITCH LEAD CLIMBING**

Rope teams practice full lead climbing from the ground up on selected routes up to 5.6, complete with building a multi-point anchor and bringing up the second. Both team members continue on for at least another pitch, up to three more pitches if time allows. Both team members then lower or rappel off, depending upon circumstances and desire for practice.

**3: MIXED CLIMBING**

As appropriate for individuals and available conditions, practice climbing on top-rope or leading in moderate mixed conditions where climbers can climb rock, snow and/or ice on the same route, in crampons and utilizing ice tools.