

GENERAL TECHNICAL INFORMATION FOR RU-ABLE (Equipment and Skills)

1. Knot parts: Stand end, running end, bight, loop
(Ropes typically fail (break) where standing end enters)
Therefore: We dress our knots so they are neat and snug. Messy knots compromise strength.
2. Knots:
 - a. Figure 8 follow-through and figure 8 on a bight - a classic know used to tie directly into a climbing harness, first acceptable way to connect a participant to a dynamic belay.
 - b. Double Figure 8 – used to clip into a harness on the ABLE challenge course, second acceptable way
 - c. Butterfly Knot – used for team belays
 - d. Double Bowline – used as third acceptable way to connect participant to a belay, must be backed up
3. Two types of climbing ropes:
 - a. Low Stretch Rope: (Static) – 5% or less stretch – fibers parallel - static rope used for flying squirrel and rappel
 - b. High Stretch Rope: (Dynamic) – 7 – 10% stretch – fibers twisted – climbing ropes used to belay on high elements
 - c. Kernmantle vs. twisted rope (nitro crossing ropes are twisted and climbing ropes are kernmantle)
4. Rope care (and care for synthetic material in general):
 - a. Keep out of sun
 - b. Store in cool, dry, dark place
 - c. Retire at appropriate time (dependent on age, use, number of falls)
 - d. Keep away from chemicals (gas, bug spray, sun tan lotion, etc.)
 - e. Try not to step on
 - f. Coil appropriately
 - g. Wash with mild detergent when needed
 - h. Avoid sharp edges
5. Breaking strengths: (1 kN = 255 lbs. of force)
11 mm (7/16) rope = 30 kN or 7,000 lbs. of force (this is the size of our climbing ropes)
6. UIAA – Union International Association of Alpinism – sets standards for equipment by conduction tests. You want to use gear that is UIAA approved such as harnesses, helmets, ropes, carabiners, etc.
9. Types of carabiners
 - a. Can be made of aluminum or steel. (steel carabiners are best to use directly on cables – aluminum wears excessively on cables.
 - b. Different shapes such as: Oval, Locking D, Off set locking D, Pear shaped, etc.
10. Belay – Belaying is the safety system used to protect a climber
 - a. Hip Belay
 - b. Just Right Descender Belay
 - c. Using belay device: Left and right hand belay
 - d. Back up belay
11. Climbing Commands: (two systems acceptable)
 - a. On belay
 - b. Climbing
 - c. Climb
 - d. Up Rope
 - e. Tension
 - f. Slack
 - g. Ready to be lowered
 - h. Lowering
 - i. Off belay
 - j. On Rappel
 - k. Off Rappel
 - a. Ready
 - b. Ready
 - c. Climbing
 - d. Climb
 - e. Ready to be lowered
 - f. Lowering
12. Climbing Harness:

- a. Make sure to read instructions
- b. Follow care tips for synthetic materials
- c. Use 2-finger test to test proper fit
- d. Be sure to double back through buckle for most harnesses
- e. Tie in properly
- f. Always double harness before leaving the ground
- g. (Be able to facilitate group in harness fitting process)
- h. (Be able to facilitate use of chest harness)

13. Climbing Classification System:

- a. Class 1 – flat level walking
 - b. Class 2 – little hills some grade, ie. Rough trail
 - c. Class 3 – steeper grades, rough terrain
 - d. Class 4 – Usually need rope at this level – steep, exposed, fall could be fatal
 - e. Class 5 – 5.0 – 5.14 (at 5.10 – a, b, c, d) – need climbing equipment!!!!
- Our climbing tower and climbing walls in gym average between 5.4 and 5.6

Lead Edge Climbing - When facilitator climbs on lobster claws or other static belay systems where a fall can be more dangerous as opposed to dynamic belays.

14. Climbing Techniques: (Use these tips when helping a participant climb!!!!)

- a. Maintain 3 points of contact
- b. Use largest muscles of body to your advantage (climb with legs)
- c. Breathe!! Plan each move – pick individual route
- d. Keep weight over feet (try not to hug wall)

15. Static belay

- a. Use of lobster claws on the ABLE course (function of zorber – to minimize shock of fall so not to exceed 900 lbs.)
- b. Inspection of lobster claws

16. Course inspection and hardware

- a. Know – hardware (names and function)
- b. Know – basic inspection principles for hardware
- c. Staples
- d. Rapid Links
- e. Telephone Poles
- f. Lumber
- g. Cable (3/8 inch, Galvanized 7x19 flexible aircraft cable)
- h. Serving sleeve (protects end of cable or cable may be capped)
- i. Thimble
- j. Rope Clips or Cable clamps
- k. Ferrule (Oval Sleeve) another type of cable clamp
- l. Bolts (straight and angled) Thimble vs. eye bolt vs. threaded eye nut
- m. Fish plates, nuts and lock washers
- n. Strand vice
- o. Guy cable vs. foot cable vs. belay cable
- p. Pulleys
- q. Sheer Reduction Device

17. Technical Information:

- a. Cables and belay points must have breaking strength of 12,500 pounds – and a safe working load of 2,300 pounds. Safe working load is 1/5 of breaking strength
- b. Sag Span Ratio: Dynamic belay cables can experience significant amounts of force. The cable should sag and not be strung tight. The cable should sag %10 of its length. A 30 ft. cable should sag 3 feet.
- c. Telephone poles used on the challenge course are Class 1 poles. Class 1 poles are the highest quality poles. Class 2 and 3 poles can typically be used for low element construction where belaying does not occur.