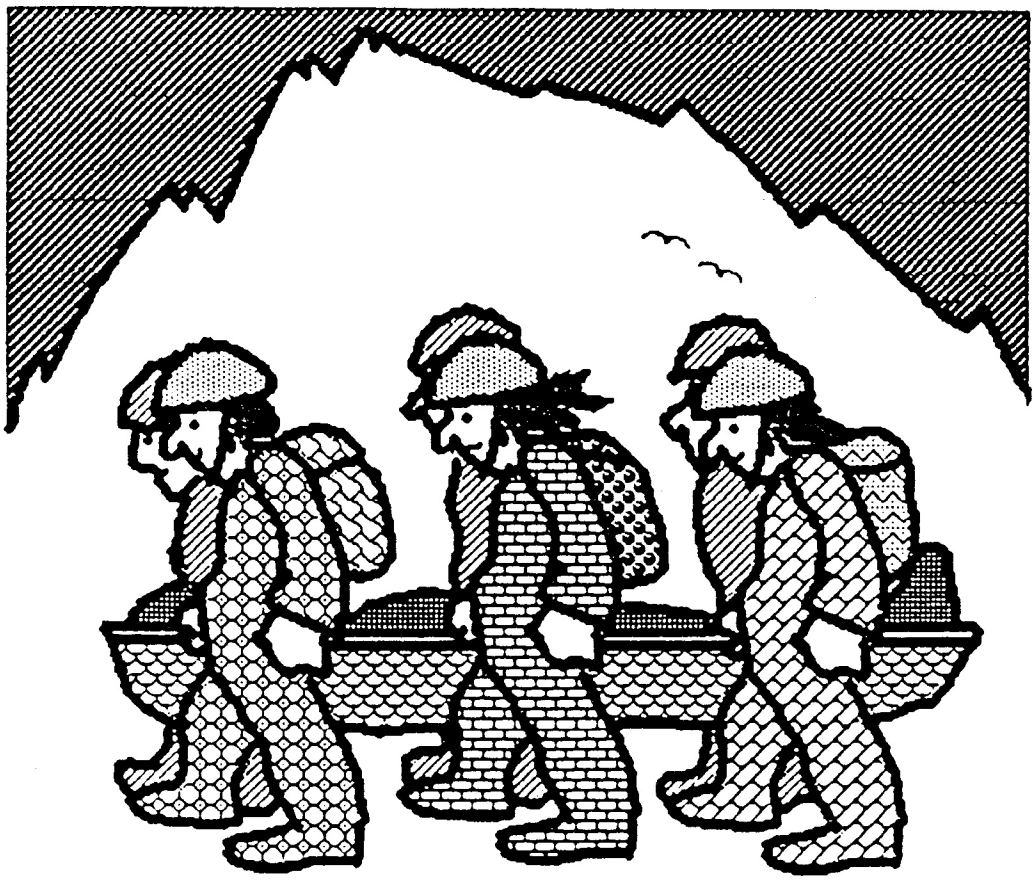


Search and Rescue Operations in mountainous terrain

VERTICAL RESCUE

Training Outline

Blue Ridge Mountain Rescue Group
Appalachian Search & Rescue Conference

DRAFT

I. Anchors

A. Natural Protection (trees, horns, flakes)
B. Fixed Protection (bolts, fixed pins)
C. Other Artificial Protection (chocks, camming devices)
D. Self-Equalizing
   1. Direction of pull
   2. Use small angles - <90 degrees
   3. Back-up anchors

II. High Angle Rescue Methods

A. Rocky Mountain Rescue Group / ASRC System

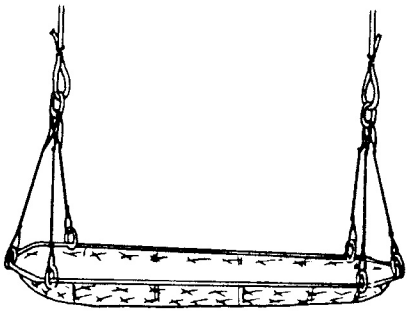


Fig. 17.16 Rocky Mountain Rescue Group's spider. Each end of the spider has an eye splice in it.

1. Advantages: Stability while loading patient - when one spider is detached, other two stabilize
2. Disadvantages: Cannot adjust angle of stokes to rock or protect patient from rockfall, uses two independently controlled lowering ropes without joining at a common point, requires constant communication with *two* attendants, and it is more difficult to pass knots.

B. Yosemite System

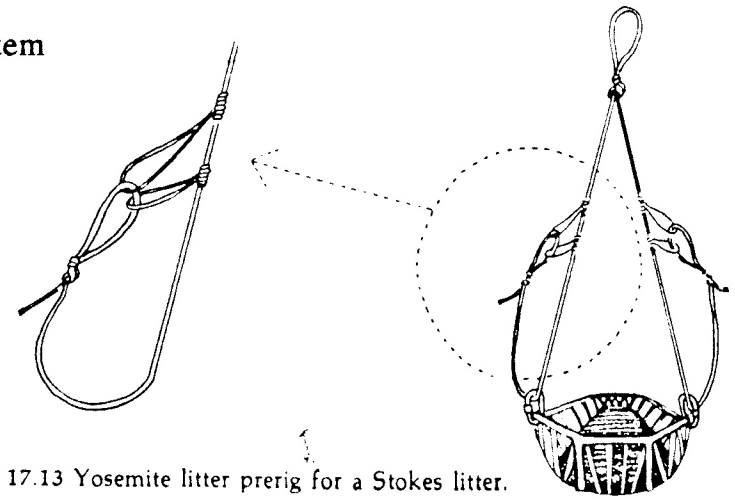


Fig. 17.13 Yosemite litter prerig for a Stokes litter.

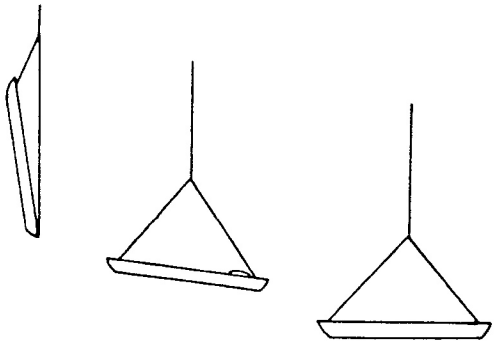


Fig. 17.14 Possible variations of litter positions using prerig: vertical (left), shock position (center), and horizontal (right).

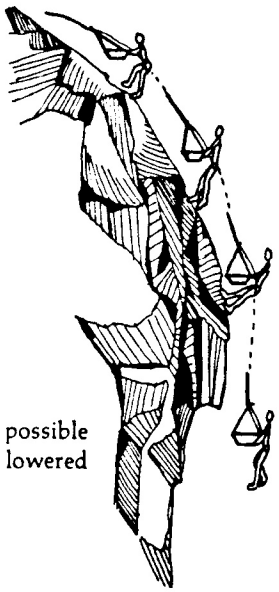


Fig. 17.15 Side view of possible variations of litter as it is lowered down a rock wall.

1. Advantages: Litter can be set at many different angles, patient can be protected from falling rock, in high angle situations- it only requires one attendant, and it is easier to pass knots.
2. Disadvantages: Not as stable for loading.

III. ASRC Vertical Rescue

A. Equipment
   1. Personal
      - helmet, seat harness, fieldpack, gloves, prussiks, locking carabineers, figure-8

2. Group (minimum)
   - 3-4 Static ropes, 1-2 dynamic ropes, 2-4 Gibbs ascenders, long slings, short slings, carabineers, pulleys, edge padding or rollers, radios, prussiks, spider rigging, rappel rack, rack of protection, straight stokes

B. Personnel Involved
   2 - Attendants
   1 - Brakeman
   1 - Assistant Brakeman / Radio Operator
   2 - Gibbs / prussiks monitors
   1-2 - Belayers
   1 - Rescue Specialist
   Others may be employed in rope management, padding placement, and as personnel to manage second lowering system for knot passing
   8 - 12 People Minimum

C. The Lowering

V. Passing Knots

A. RMRG and ASRC System

B. Yosemite System

Sources:

Appalachian Search & Rescue Conference, Inc.

Fisher, Udo. "Search and Rescue Operations in Mountainous Terrain" *NASAR '85 Conference Papers*, National Association for Search and Rescue.

Setnicka, Tim J. *Wilderness Search and Rescue*. Appalachian Mountain Club: Boston, 1980.

While this needs to be quantified on a testing machine, it seems logical. Therefore, in straightforward lowerings with no knots to pass and no anticipated reasons to stop the lowering, say to bypass an obstacle on the way down, prusiks could be dispensed with, although this should be a very carefully chosen option.

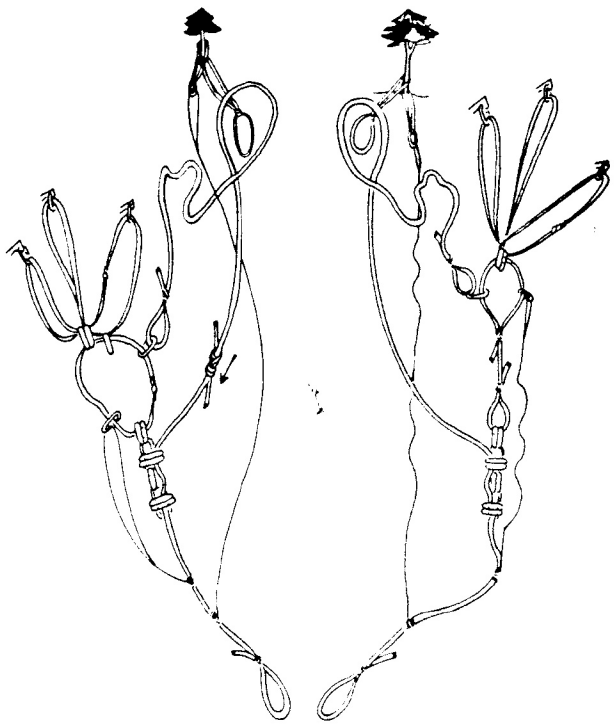


Fig. 18.3 Passing a knot during a lowering operation. As the knot on the left rope approaches the breaking system, the right rope takes the load.

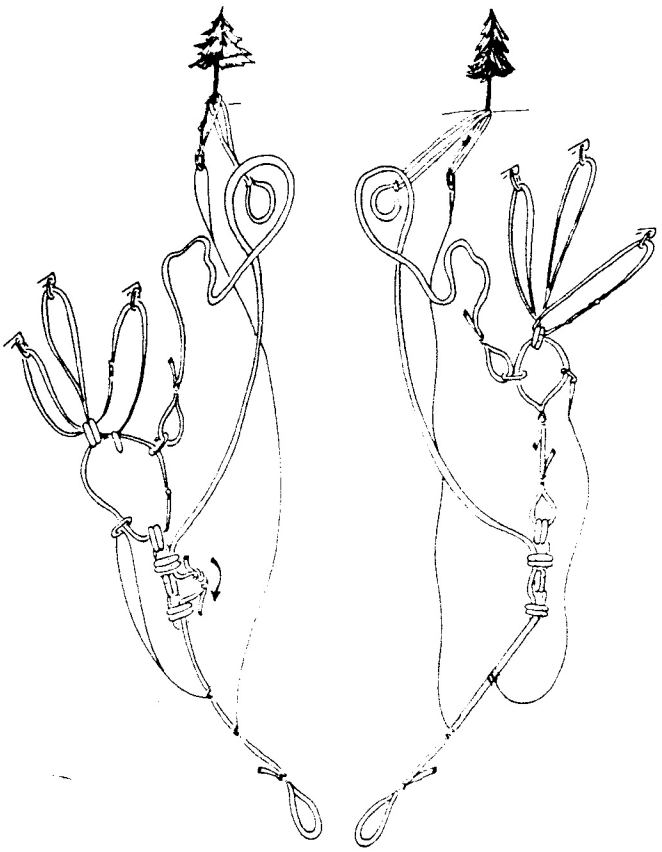


Fig. 18.4 After the right rope takes the load, the knot is clipped through one brake system at a time.

Fig. 18.5 The right rope continues to be lowered slowly and the knot is passed through the carabiner and the prusiks one at a time. This way the system is still belayed even if the right rope should suddenly break. During this process the prusiks are not set.

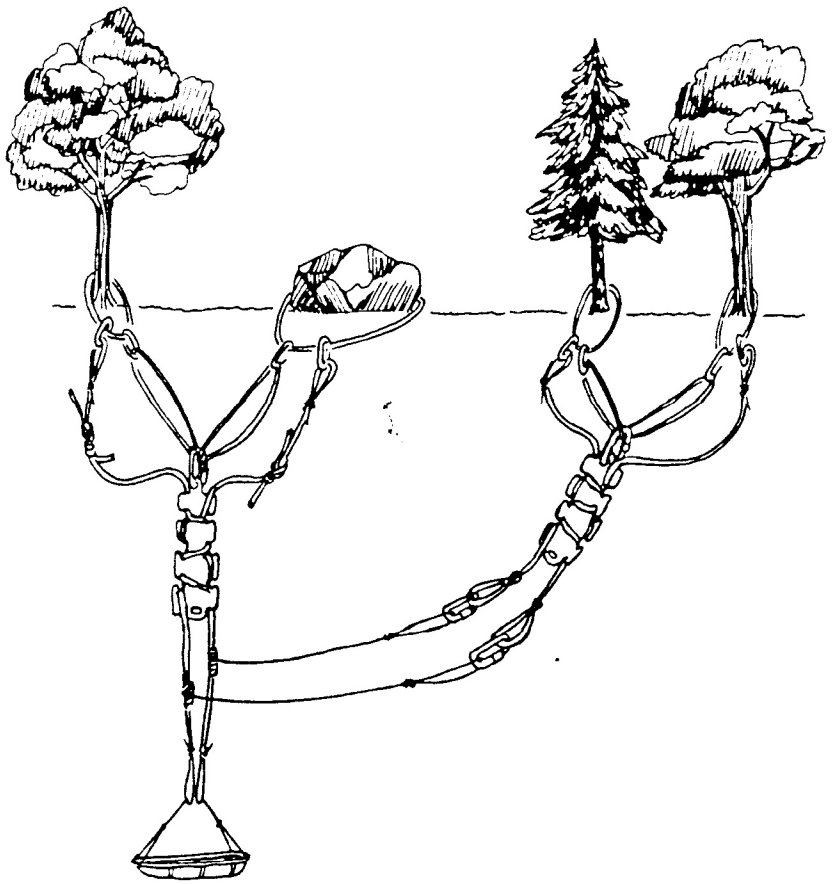
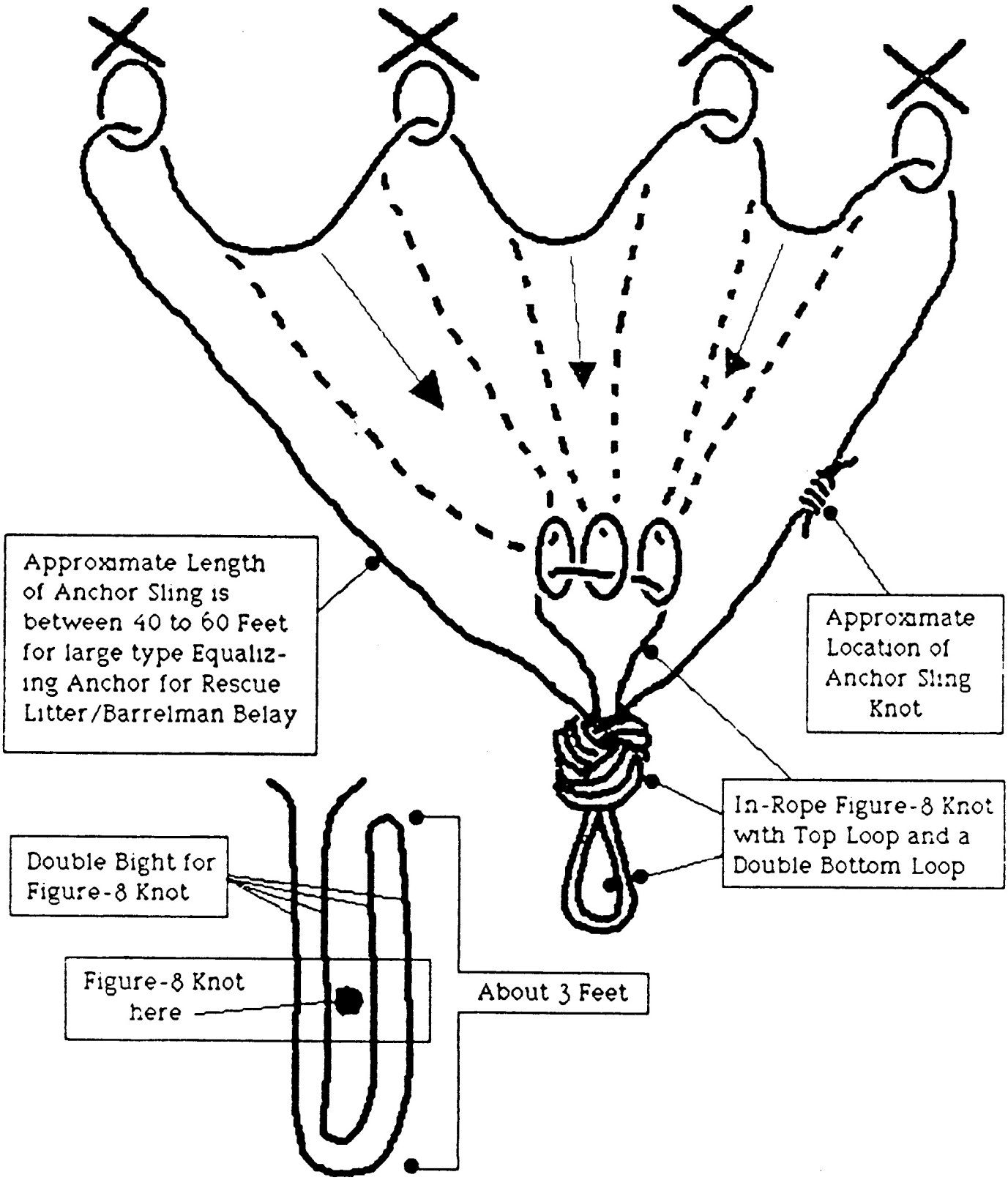


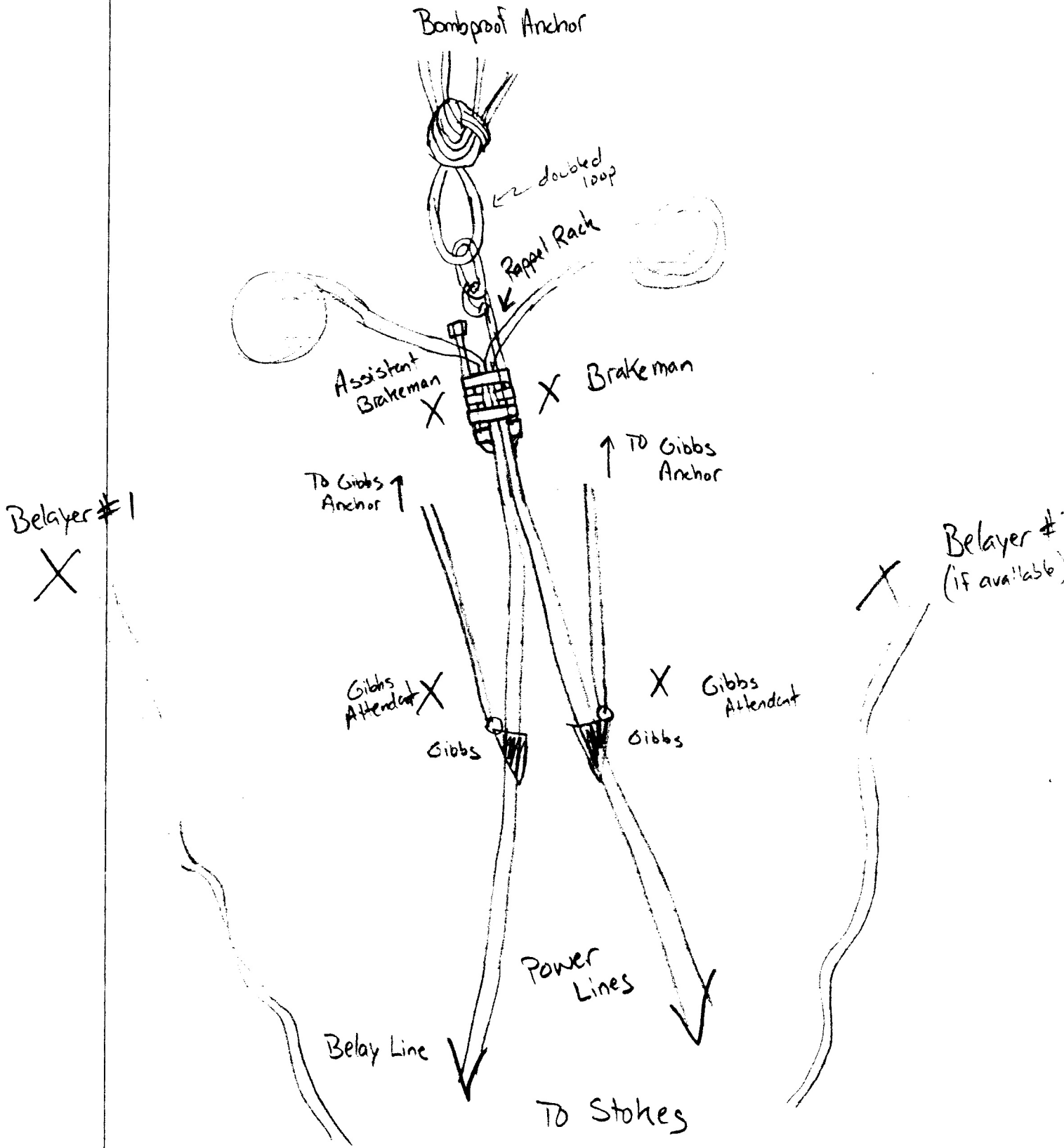
Fig. 18.6 Passing a knot using two brake plates.

An alternative and less efficient lowering system uses a main lowering rope with a second, *separate belay* rope. This system must be well designed, and one must be assured that the belayer could hold the entire system during any stage of the lowering in case a problem arose or a knot had to be passed. Usually a friction device has to be rigged for the belayer so that he or she can hold the weight of two or three people. It is probably just as easy to rig two identical systems, without discriminating between the functions of lowering and belaying. After all, this is an age of equality and androgyny, right?

Equalizing Anchor System

(this is just one example)




Bombproof Anchor
doubled loop
Rappel Rack
Assistant Brakeman
Brakeman
TO Gibbs Anchor
To Gibbs Anchor
Belayer #1
Belayer #
(if available)
Gibbs Attendant
Gibbs Attendant
Gibbs
Gibbs
Power Lines
Belay Line
TO Stokes