BELAY ON

BOY SCOUTS OF AMERICA

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BOY SCOUTS OF AMERICA®

430-500
2016 Printing

INTRODUCTION

This reference manual may be used as a resource for COPE and climbing programs operated within the Boy Scouts of America; however, it is not intended to be an exclusive reference. There are many other resources with good information that may also be useful for these programs. The current BSA *Guide to Safe Scouting* and Age-Appropriate Guidelines for Scouting Activities provide guidance for programs involving members of the Boy Scouts of America. National Camp Accreditation Program (NCAP) standards supersede anything in this manual that may appear to be contradictory. The *Guide to Safe Scouting* and national standards are updated periodically.

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PART ONE

FOUNDATION

CHAPTER 1

Leave No Trace

The COPE or climbing site is an outdoor resource that can aid in the overall development of character in young people. The safety and well-being of participants and staff are of paramount importance, closely followed by preservation of the natural setting. By using Leave No Trace outdoor ethics to govern the stewardship of this resource, it will be preserved for future generations to use. Aspire to climb without leaving a trace.

PRINCIPLES OF LEAVE NO TRACE

Plan Ahead and Prepare

Proper event planning and preparation help COPE or climbing participants achieve their goals safely and enjoyably while minimizing damage to natural resources. When confronted with unexpected situations, poorly prepared participants often resort to high-impact solutions that degrade the outdoors or put themselves at risk.

Poor planning often results in:

- High-risk travel or emergency evacuations because participants were not prepared for a remote location or did not protect themselves from insect pests, poisonous plants, and bad weather.
- Improperly located sites that do not have proper screening between events, leading to unintended interaction between groups on the course.
- Excessive trash or personal items left behind because of failure to plan properly for the events of the day.

Keep these points in mind when planning COPE and climbing activities:

- Though it may seem there is plenty of room for new routes, rock resources are limited.
- When considering establishing new routes, weigh whether the local ecology can withstand the increased traffic (new trails, etc). Does it really add something new to the other climbs in the area?
- Adjust loose rocks to make them stable instead of tossing them over the edge.
- Avoid high-impact rigging using bolts or other permanent installations when other options are available.
- Chipping and drilling destroys the rock. Use removable protection and natural anchors—no pitons.
- Bolts should only be used when no other protection is available.
- Protect trees used as anchors.
- Do not allow pets at the program site.

Travel and Camp on Durable Surfaces

Damage to land occurs when surface vegetation or communities of organisms are trampled beyond recovery. The resulting barren area leads to the development of undesirable trails and soil erosion.

Guidelines for travel at the COPE or climbing site include:

- Always use durable roads and trails to access climbing routes and COPE courses.
- In event areas, participants should concentrate activity. Use the connecting trails to prevent damage to natural areas and screening vegetation.
- When traveling off of connecting trails for events such as trust walks or to access new climbing sites, try to follow existing game trails and avoid sensitive plant communities or untraveled natural areas.
- Good camps and bivy sites are found, not made. Altering a site is not necessary.
- Use existing anchors when available.
- When unpacking gear at climbing sites, choose a durable location for your staging and belay areas.
- When camping, place tents and cooking activities in designated areas that have been developed for these uses.
- Only emergency, maintenance, and service vehicles are allowed beyond the warning signs of the COPE or climbing site.

Dispose of Waste Properly

Always use designated trash and recycling receptacles when provided. In remote areas, COPE and climbing groups need to take their trash out with them. There is no reason people cannot carry out materials that they carried in with them in the first place. Though most trash and litter is not significant in terms of the long-term ecological health of an area, it does rank high as a problem in the minds of many visitors. Trash and litter detract from an area's naturalness. Always remove trash and abandoned or forgotten gear and cordage. Try to leave the area nicer than you found it.

Always use designated trash and recycling receptacles when provided.

Wastewater and Trash

Prevent contamination of natural water sources by disposing of wastewater only in designated areas. Minimize the need to pack out food scraps by carefully planning meals. Place all trash in garbage bags and take them to designated areas when the program is completed.

Human Waste

Proper human waste disposal prevents spread of disease. Use restroom facilities when provided. In remote locations, practice human waste disposal techniques that have been recommended by your group leader (e.g., catholes).

Leave What You Find

Allow others a sense of discovery; leave rocks, plants, archaeological artifacts, and other objects as found. The COPE or climbing site may be home to rare and delicate plant species or historical artifacts. Do not write names at climbing sites with chalk.

Minimize Site Alterations

Challenge courses built in trees should be constructed and maintained to preserve the health of the trees and surrounding ecosystem. Trees used as anchors should be protected from damage. Do not dig tent trenches or build lean-tos, tables, or chairs from natural materials at the site. Stay within designated areas to avoid trampling vegetation near program sites. If you clear an undeveloped area of rocks or twigs, replace these items before leaving. On high-impact sites, it is appropriate to clean the site of any debris when you leave and to smooth over holes in activity areas covered by wood chips or gravel.

Minimize Campfire Impacts

The only appropriate place to build a fire is within an existing fire ring. Many program areas are heavily wooded and fire danger can become extreme in late summer. True Leave No Trace fires are built only as large as needed. Cooking fires and fires built for evening sessions should be modest in size. Large fires may send sparks into the air and damage overhanging tree branches. Frequent feeding of small fires also creates activity for evening sessions. At times, open fires may be prohibited. Check for any fire bans before building a fire. Building fires at the base of most crags is unacceptable.

Respect Wildlife

Quick movements and loud noises are stressful to animals. Considerate people practice these safety methods:

- Observe wildlife from afar to avoid disturbing them. You are too close to wildlife if an animal alters its normal activities.
- Give animals a wide berth, especially during breeding, nesting, and birthing seasons.
- Store food securely and keep garbage and food scraps away from animals so they will not acquire bad habits. Help keep wildlife wild.
- Do not disturb nesting locations on natural rock.
- Vertical rocks represent unique biological communities. Choose sites free of fragile plants such as lichens.

Be Considerate of Other Visitors

Thoughtful participants:

- Let nature's sound prevail. Avoid speaking loudly or making loud noises unless necessary for communicating with your climbing partners or COPE participants.
- Leave audio devices and pets at home to keep the noise down.
- Use earth-toned slings whenever possible.
- Bolts should match the rock or be painted to camouflage. (This is required in Europe.)
- Use earth-toned chalk sparingly, particularly out west. Keep all chalk close to reduce the likelihood of spills.
- Use discrete anchors at the tops of climbs. Avoid chain, which blows around and makes noise.
- Enjoy enthusiastic participation and celebration with the COPE or climbing group without raucous or boisterous behavior.
- Don't hog all the climbs. Larger groups should try to not monopolize popular climbing routes, especially during times of high use.
- Remove equipment at the end of each day.

See **http://lnt.org/blog/leave-no-trace-rock-climbing** for additional Leave No Trace suggestions.

CHAPTER 2

Challenge by Choice* and Setting Goals

Challenge by Choice is a concept that was originally developed by Project Adventure and is a key principle of COPE and climbing. If a group is practicing Challenge by Choice, individuals may choose the level at which they want to participate in the various COPE and climbing activities without being pressured or coerced by the group and without having to justify their choice. The goal is to have individuals find opportunities where they can get out of their comfort zone so they can be challenged and grow internally. The key component is that individuals may choose the level at which they want to participate. Challenge by Choice does not mean a person can simply skip an activity that everyone else is doing. It does mean that they may choose how physically and emotionally involved they want to be in the activity. Based on their choice, as facilitators we need to find an appropriate and meaningful role for them.

While no participant should be pressured or coerced, everyone should be encouraged to participate in all of the COPE and climbing activities. Facilitators must be aware of the fine line between encouragement and pressure. As a facilitator, you need to watch for both direct and indirect pressure that may come from the group. Actions of direct pressure include participants being told what to do by other members of the group and being volunteered by others. In some cases, there may be actual physical interaction as one participant attempts to coerce another. Indirect pressure can be much more subtle and could be in the form of put-downs, comments that on the surface appear to be attempts at humor, glances, or other nonverbal gestures of communication. The bottom line is that the group must be accepting of each individual's choices.

As a facilitator, it is important that you recognize how your behavior or comments can influence individual or group choices during a COPE or climbing event. In their desire to see individuals or groups succeed, facilitators or adult leaders may try to guide them toward a particular solution or use their position of authority to suggest what might be the "best" choice. Doing this takes away the individual's or group's opportunity to experience the joy of discovery in

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finding their own solution to the challenge. It is important to remember that there is more than one way to successfully complete each of the COPE and climbing challenges and that the way you learned to solve them might not be the best way.

No matter what level of participation individuals choose, as a facilitator it is your responsibility to make sure they are part of the group. It is easy to simply assign them the role of observer or some other pointless chore that does not make them a part of the group. Facilitators need to resist this temptation, instead asking participants how they want to be included and making them part of the choice process.

In guiding them through this process, the facilitator needs to walk the fine line of helping the participants develop options from which they can choose versus telling them what they should do. Once the participant has selected his or her option, both the group and the facilitator should respect that choice. There may be instances when someone makes a poor choice. This then opens up the opportunity to talk about how we make choices and the impact they may have on us or the group. One way to open this dialogue is to relate their choice to the Scout Oath, Scout Law, or motto.

If practiced correctly, outcomes of Challenge by Choice should include:

- Participants finding opportunities to develop and grow during their experience
- Increased value to the group as individuals find ways to contribute to the group's development
- Increased respect for well-thought-out choices
- Development of a supportive and caring group environment
- Increased acceptance of individual and group decisions

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**Written by Jackie Gerstein, 1988.

THE FULL-VALUE CONTRACT©*

The Full-Value Contract is the starting point of a group. It is an opportunity to establish ground rules to which the group can agree. It represents both a personal and interpersonal agreement built on value for each person and for the group as a whole. When following Challenge by Choice, the contract helps each participant feel comfortable with what they choose to do during an activity. It should also provide a process or mechanism for addressing problems or issues as they arise.

As a facilitator, it is your responsibility to model the appropriate behavior described in the group's Full-Value Contract. This is especially important during the early stages of group and team development.

Typically, three basic commitments form the Full-Value Contract:

- Work together as a group and strive to achieve individual and group goals.
- Adhere to certain safety and group behavior guidelines that provide for the physical and emotional safety of the group.
- Give and receive feedback, both positive and negative, and strive to change behavior when it is appropriate.

Many times it is difficult for groups or teams to begin the development of their Full-Value Contract. They are not sure where to start, members may have trouble expressing their thoughts, or the dominant members of the group may try to force their ideas on the rest of the group. As the facilitator, it is your responsibility to guide the group through this process, ensuring that all of its members are heard and represented in the final Full-Value Contract. One way to accomplish this is to provide examples for them.

Participant Rights**

- I have the right to be treated as a respected individual.
- I have the right to express my opinions, thoughts, and feelings.
- I have the right to participate by my own choice.

- I have the right to celebrate personal and team successes.
- I have the right not to have values of group members imposed on me and not to be exposed to undue pressure from other group members.

Responsibilities of Participants**

- I will preserve confidentiality of other group members.
- I will participate in program activities by my choice.
- I will speak only for myself and not other group members.
- I will ask for what I want and need.
- I will be willing to share myself with others.
- I will treat group members with dignity and respect.

Two other examples that have been used in experiential education are the Five Finger Contract and PEEP.

Five Finger Contract

When using the Five Finger Contract, the facilitator holds up a hand and explains that each finger represents a point in the contract.

- The thumb is for thumbs-up, meaning as a group we will always be positive and supportive of the individuals in the group and our group goals.

The thumb is for thumbs-up, meaning as a group we will always be positive and supportive of the individuals in the group and our group goals.

- The pointer finger means we will take personal responsibility for our actions instead of pointing blame.
- The middle finger is to remind us to be aware of put-downs and to use appropriate language and behavior.
- The ring finger is our commitment finger, which indicates a willingness to work toward helping the group reach its goals and letting go of our individual goals or agendas.
- Our little finger is our safety finger. It is the smallest and most vulnerable finger. It reminds us that we need to keep the members of our group physically, psychologically, and emotionally safe.

PEEP

PEEP is an acronym for Physical, Emotional, Environmental, and Personal.

Physical—Includes being aware of your physical limitations as well as those of the other members of your group. It includes taking care of your personal needs by following Challenge by Choice and dressing appropriately during COPE and climbing activities.

Emotional—Includes the use of the group's Full-Value Contract and Challenge by Choice. This would include not using put-downs or volunteering others, looking for individual hidden agendas that take away from the group, and being aware of the group's dynamics.

Environmental—Includes being aware of your environment during your participation in COPE and climbing activities. If you are outdoors, it includes being aware of the weather, practicing Leave No Trace, and being a good steward of the environment. If you are indoors, it includes awareness of the space limitations of the room(s) you are using.

Personal—Includes taking responsibility for yourself and your needs as you participate in COPE and climbing activities.

In developing its Full-Value Contract, the group should have a method to capture members' ideas to take with them on the COPE or climbing course. This could be as simple as writing them down on a piece of paper or carrying symbols or pictures that represent the various points of the team's contract. During their day on the COPE or climbing course, the group should review its contract and reflect on how well members are following it or using it if conflict develops.

GOALS

"You can't get to the top of Everest by jumping up the mountain. You get to the mountaintop by taking incremental steps. Step by step you get to the goal."—Robin Sharma, author of *The Greatness Guide*

A goal is a specific, measurable achievement that helps an individual, group, or team accomplish a challenge or task. A key component of any goal is action, which is a step or task a person needs to accomplish to reach the goal.

Why do we set goals?

- Goals provide a target.

It has been hypothesized that we have a success mechanism as part of our subconscious mind. This mechanism continually searches for ways to help us achieve our goals and resolve problems. When we reach the goal or solve a problem, we feel better about ourselves. For this mechanism to work, we need a target—our goals. If we do not establish goals to represent what is important to us, then we pursue targets that have little or no meaning.

- Goals help us to focus our time and efforts.

During the day we are faced with many choices for how to spend our time. We usually select what we perceive to be the most important, even though it may not help us to accomplish our task or challenge. Many times the issue we focus on is the last thing that was given to us or the last item someone talked to us about or what we think would be fun to do. Once we set goals, we know where to put our time and energy to meet specific, meaningful targets.

- Goals provide motivation and persistence.

Many of you have heard the saying "Life's not easy; deal with it," or have listened to top athletes talk about their struggles to get to the top of their game. Along the way they may have had to overcome mental or physical challenges or failures. Why did they keep going and not just give up? What motivated them to continue? A commitment to a goal provides a strong sense of purpose that keeps them striving to achieve at a high level.

- Goals help us set priorities.

Every day we are faced with all sorts of distractions that could easily fill our day with other people's interests and needs. Usually these are short-term issues that distract from our long-term task or challenge. Goals provide a framework for us to set priorities and make choices based on our long-term view of what is important. Our goals help ensure we take the correct fork in the road when we need to make a choice.

- Goals provide direction.

Our goals provide direction that prevents us from going down the wrong road. When you commit to your goals, you will use your resources to accomplish them.

Large goals that may seem impossible to achieve need to be broken down into smaller goals that you can achieve. Use your successes to measure your progress on the road toward the larger goal and to make sure you are staying on course. If you appear to be straying down the wrong road because of the obstacles and setbacks you encounter, learn from your mistakes and adjust your plans.

SMART Goals

There are many different ways to set goals. One of the most common is to establish a SMART goal. A SMART goal is *s*pecific, *m*easurable, *a*ttainable, *r*elevant, and *t*ime specific.

Specific—Using simple language, provide a detailed description of what you want to accomplish, how you will accomplish it, why it is important, who is involved in accomplishing it, when it will be accomplished, and how you will know that you have accomplished it.

A specific goal will typically answer the five "W" questions: who, what, why, where, and when.

Measurable—Measurable means either the team or you are able to determine when the goal has been achieved. But more importantly you can also measure your progress from the start to the achievement of the goal. This is important to allow for *benchmarking,* which is a process the team or you should use to determine if you are on schedule. You also need to consider how you will reward yourselves when you reach a benchmark or attain your goal.

Making your goal measurable basically answers the question: How will I know when I have accomplished the goal?

Attainable—To be successful, a goal must be attainable. To be attainable, it must be realistic. This means that the goal is achievable by the team or individuals. While it may be a stretch or difficult to attain, a goal should not be so extreme it cannot be achieved or so easy that it is considered meaningless. This implies that the various members of the group or team have the skills, resources, and authority to achieve both the goal and the objectives. The goals should also be established based on your level of motivation. Motivation drives action and action achieves goals.

Relevant—A goal needs to matter and drive us forward. There must be a reason for the group or team to pursue that goal. For the goal to be relevant, it needs to be understood by everyone. As an individual, if other people understand your goals they can help you to achieve them and hold you accountable. If you are working as part of a team, unless everyone understands the direction the team is going, there will be a lot of wasted resources and effort directed toward nonproductive activities.

Time specific—There needs to be a definitive time for the completion of the goal. This commitment to time helps to motivate the team by creating a sense of urgency, keep it focused on what is important, and determine the correct actions to take when faced with choices.

While not a characteristic of a goal, an important component of goal management is rewarding yourself or the team when you are successful. The celebration of success serves as a motivator for accomplishing other current or future goals. Some individuals and teams will also have a mini-celebration each time they successfully complete a major action step as a way to further motivate the team. Either way, take the time to recognize the completion of each goal and to reward yourself for a job well done.

Setting Goals

One way goal setting can be applied to the COPE or climbing course is for groups to decide on a level of challenge. Before engaging in activities, instructors should ask each group to decide on a level of challenge, ranging from 0 (no challenge) to 10 (highest level of challenge). Goals should be desirable (consistent with the ideals and values of the Boy Scouts of America), realistic (not too difficult or too easy), achievable (capable of being accomplished by this group), and measurable (it can be decided whether and to what degree the goal has been met).

Sometimes, as a facilitator, you may need to guide the discussion to make sure the goals are attainable (neither too hard nor too easy) and appropriate for the COPE or climbing activity the group is about to do. It is important to honor Challenge by Choice, and in many cases it will be more effective to allow the group to decide its own goals and level of challenge. Even though the group may not have taken part in COPE or climbing activities before, encourage group members to make their best guess as to what they can do as a group. The group should reach a consensus in choosing its goal.

When preparing to do either a high- or low-course element, ask the individuals in the group to answer the following questions before engaging in a large group discussion:

1. Today I can easily _____
   _____ .
2. It will be a risk or challenge for me to _____
   _____ .
3. On this activity I cannot imagine doing _____
   _____ .
4. As a team, the support I need from each of you is
   _____
   _____ .

These questions have no wrong answers. All participants' answers should be valued and their individual choices respected. After hearing the responses, the group can then develop a group or team goal without imposing their will on an individual. As a facilitator, your responsibility is to make sure that the final group goal is not imposed on individuals without their consent.

CHAPTER 3:

Warm-Ups and Initiative Games

WARM-UPS

Before beginning vigorous exercise, it is often recommended that participants engage in stretching exercises as well as some warm-up activities.

Stretching refers to any of a number of exercises whose purpose is to increase the flexibility of the soft tissues surrounding joints in order to prevent injury. Actually, the entire topic of stretching before exercise is a very controversial subject among expert exercise physiologists. Some believe that it is crucial and should be incorporated into everyone's exercise routine. Others are less enthusiastic and claim that its benefits are largely unproven. What should be the approach to stretching before participating in a challenge course?

For youth participants, the benefits of stretching are likely quite small. Unless they are in the process of healing from an injury, most youngsters are already quite flexible. A formal set of stretching exercises for them is probably unnecessary. Instead, there probably is benefit from exercises designed to improve balance. These would include things like standing on one leg for a period of time, with or without the challenge of moving the other leg in some way. Walking heel to toe is another example. These can prepare participants for elements, both low and high, in which balance is important. Balance balls are superb devices for providing balance exercises, and may be incorporated into some initiative activities or low elements.

Adult participants are much more likely to benefit from some sort of flexibility routine. Unfortunately, the types of stretches most often described may not target areas likely to be problems for adults. The two areas to which adult participants on challenge courses are most likely to suffer injuries that could be prevented by stretching are the shoulder and the lower back.

Elements that involve hanging unsupported (e.g., the Wall) or pulling one's weight with one's arms (e.g., Multivine Traverse) may result in a painful shoulder that can persist for a long period of time. Often, this becomes a recurring problem for adults, who find that they are limited in their range of shoulder motion.

Elements that involve bending or twisting (e.g., the Water Wheel or the Porthole) or that lead to sudden deceleration (e.g., the Trust Fall) may result in strains to the lower back, including the muscles of the buttocks and back of the thigh. Some adults seem more prone to such injuries than others.

In light of this, stretching exercises for adults should include routines targeting these areas. There are a number of specific stretches that accomplish this, and all have some common denominators. Stretches should be gentle and prolonged for 30 seconds or so, rather than done as impulses. Stretching should never be continued past the point of pain. Stretches are best done after a period of warming up, rather than before.

"Warming up" refers to exercise that puts some stress on the heart and lungs, resulting in an increased pulse and breathing rate. Warm-ups are essentially stretching exercises for the heart and lungs. If effective, they should result in a few moments of breathlessness and sweating. Most course facilitators like to develop a menu of initiative games that incorporate some bursts of aerobic activity as a warm-up routine. Various types of tag initiatives are excellent for this purpose.

Warm-Up Resources

These books are excellent resources for warm-up activities:

- Cain, Jim. *The Official Internet Edition of Raccoon Circle Activities.* www.teamworkandteamplay.com/raccooncircles.html.
- Cain, Jim, and Barry Jolliff. *Teamwork and Teamplay.* Kendall Hunt Publishing Co., 1998.
- Cain, Jim, and Tom Smith. *Book of Raccoon Circles.* Kendall Hunt Publishing Co., 2006.
- Fluegelman, Andrew, ed. *More New Games and Playful Ideas.* Dolphin Books/Doubleday and Co. Inc., 1981.
- Rohnke, Karl. *Cowstails and Cobras II: A Guide to Games, Initiatives, Ropes Courses, and Adventure Curriculum.* Project Adventure Inc., 1980.
- Rohnke, Karl. *Silver Bullets: A Revised Guide to Initiative Problems, Adventure Games, and Trust Activities.* Project Adventure, 2013.
- Stanchfield, Jennifer. *Tips & Tools: The Art of Experiential Group Facilitation.* Wood 'N' Barnes Publishing Co., 2008.
- Weinstein, Matt, and Joel Goodman. *Playfair.* Impact Publishers, 1980.

Icebreaker Activities

Introduce group members to one another and to their leaders using icebreaker games. These games encourage participants to begin building group identity and trust, and to become comfortable with the possibility of taking small risks together.

- Sightless Height Alignment
- Ping, Pong, Zap
- Toss-a-Name
- Traffic Jam

Flexibility Activities

Flexibility exercises use slow, stretching movements and can follow icebreaker games. They prepare participants for upcoming activities and help them develop body awareness by focusing on particular muscle groups and body parts. Emphasize correct methods for performing flexibility exercises, and do them without bouncing or jerking.

- Hoops Around the Circle
- Inventor's Machine
- People to People

Cardiovascular Activities

Cardiovascular exercises elevate the heart rate and increase the flow of blood to the muscles. These exercises may utilize hopping, jumping, jogging, skipping, fast walking, sliding, galloping, and leaping. Staff members can encourage participant interaction by using some "new leader" exercises in the context of cardiovascular activities. Designate one participant as the leader to begin an exercise. Change the leader or the exercise every 10 seconds.

- Couples Tag
- Add-on Tag
- Attack of the Blob
- The Clock
- Moonball
- Rat Tails
- Stepping Domes
- Crows and Cranes

Balance Awareness Activities

Balance exercises promote an awareness of where the body is in relation to its surroundings. The objective should be supporting one's own body weight. Each balance position should be maintained for three to five seconds. Balance can be improved through practice. Encourage participants to try each exercise several times. Increase the challenge by asking participants to close their eyes. Balance exercises can be structured for either groups or individuals.

- The Candle
- Everybody Up
- Human Spring
- Stepping Domes

Group Awareness Activities

Group awareness activities promote cooperation and trust, improve communication, and build team spirit through touching and other appropriate interaction. They can be done with large or small groups.

- Everybody Up
- Have You Ever …?
- Moonball
- Tangle Knot

How to Choose a Game

Select a game that will fit the purpose. If the group has difficulty communicating, select a game that promotes communication. If the group has a dominant personality, use the setup and story for the game to allow others the opportunity to experience leadership. Time, space, rules, and, most importantly, the story determine game dynamics. Varying these elements can make the game fit the purpose and can make it safer for the participants. Some games allow participants to build up inertia. Limiting the size of the playing area can minimize this. Bear in mind the age level of the participants and difficulty of the game. Practice the game ahead of time. This reveals game dynamics and hidden pitfalls.

Games must be carefully sequenced. Selecting games that require high energy levels one after another is detrimental to learning. Vary the objectives of the games to keep the interest level up. Note that different groups may have vastly different results with the same game.

The Game Process

Games, including the on-course elements, follow a process. The first three parts of the process are initially undisclosed to the participants. That process is as follows:

- **Objective (silent).** Select an objective based on the needs of the group.
- **Players (silent).** Assess the players emotionally and physically.
- **Environment (silent).** How much time and space is available? Is the available space appropriate for the game to be played?
- **Expectations (aloud).** Explain beforehand what is expected of the group.
- **Materials (aloud).** Games without props or with "something mysterious from the bag of tricks" have advantages. Games without props require only imagination to run. A bag of tricks always keeps the participants wondering what is going to come next. Props need not be expensive and should have multiple uses.
- **Rules (aloud).** Make sure all participants understand the rules. The rules may need to be demonstrated. In some circumstances, it may be appropriate to let the group decide what the rules are.
- **Play (aloud, very loud).** Play the game, be flexible, and have fun facilitating. The rules may need to be changed as the game unfolds. If the game is going too quickly, adjust the story to make it more difficult. If it is going too slowly, adjust the story to change the conditions in order to speed things up.
- **Reflection (aloud).** Make sure the objective is attained and that the group realizes it has been attained. Be open to the possibility that the initial objective may not exactly match what is eventually achieved. It is all about the group, not the facilitator.

Examples of Warm-Up Activities

Add-on Tag: Define a limited boundary. Have participants pair up. One pair is It and attempts to capture another pair by tagging them. The group that is It gets larger and larger as tagged pairs join it until only one pair is left untagged.

Attack of the Blob: Define a limited boundary. Give three participants one soft foam ball each. These three "Blobs" take large, lumbering steps, make Blob noises, and chase humans. If a human gets hit by a foam ball, the human becomes a Blob and receives a foam ball. The only protection from the Blob is to fall into a dead bug position.

The Candle: Each participant balances on one foot, tucking the other up against the inside of the opposite thigh. Put palms together in front of the chest and, while keeping the palms together, raise hands over the head. Close eyes as hands pass eye level. Maintain balance for 10 to 15 seconds, then switch legs and repeat.

The Clock: Have the group join hands in a circle. Mark four spots inside the circle as "12 o'clock," "3 o'clock," "6 o'clock," and "9 o'clock" using cones or other markers on the ground. Have the group rotate 360 degrees in one direction, returning to the starting position, in as little time as possible, while maintaining the grip on each other's hands. If the chain of hands is broken, the group starts again. After discussing strategies, the group can try to improve its previous mark.

Couples Tag: Have participants form a large circle standing arm's length apart. If there is an even number of participants, designate one person to be It and another to be chased. If there are an odd number of participants, designate two people to be It, chasing one person. Have the rest of the group link elbows with one person standing next to them. Limit the boundaries of the game to a circle that is 4 feet larger than the circle of participants. Participants cannot move unless they are It or being chased. Running during this game can result in injuries, so limit movements to "silly walks" or some other creative technique. The person who is being chased can reach safety by linking elbows with a person who is part of a linked pair. The other person in that pair then becomes the one being chased. The person being chased must move at least one pair away from their previous position before linking elbows with a new person. Continue the game until everyone has had a chance to actively participate.

Crows and Cranes: Define a playing area similar to a volleyball court. Divide the group into two teams, "Cranes" and "Crows," lining them up to face each other across the center line. When Crows are called by the leader, they chase the Cranes to the rear boundary area, and vice versa. When tagged, players must stand still (or join the other team).

Everybody Up: Pairs of players sit facing each other with feet touching and knees bent. Without placing any other body parts on the ground, the pair must stand up together. Have each pair practice a few times, and then combine pairs to form groups of four, eight, 16, etc. Spot larger groups.

Human Spring: Split into pairs facing each other with arms up and palms facing each other. Start out fairly close together. The object is for participants to fall toward each other at the same time when the facilitator gives the command, keeping their bodies stiff, arms bent at the elbows, and "spring" off their partner's palms back to their original position. The pairs move farther apart with each cycle to increase the level of challenge. There is a risk of bumping heads together, so caution participants to lean their heads so they don't line up with their partner's.

People to People: Form pairs with partners facing each other. A single player is the "caller." As the caller yells "toe to toe," "knee to knee," "elbow to foot," etc., the pairs perform the described connections. On the call "people to people," players switch partners, and the person left unpartnered becomes the new caller.

Ping, Pong, Zap: The "spinner" in the center of the circle directs all players to learn the names of the people to their immediate right and left. As a test, the spinner calls out "Ping!" and all players shout the name of the person on their right. At the command "Pong!" they shout the name of the person on their left. At "Zap!" they shout their own name. After a few practice commands, the spinner points to a specific player and gives a command. If the player responds correctly, the spinner continues; if not, that person becomes the new spinner. The game should be played at a fast pace.

Rat Tails: Each player tucks about 4 feet of rope in a back pocket or back waistband of their pants; 1 foot of the rope dangles on the ground like a long rat tail. On "Go!" every player attempts to stomp on other rat tails and pull them out while dodging other stompers. The last one left with a tail attached is the winner. Hands may not be used for holding or pulling.

INITIATIVE GAMES

An initiative game is a type of cooperative game with a clearly defined problem to be solved. The group must use cooperation and physical effort to reach a solution. Some challenges are more cognitive than physical, and vice versa. Initiative games challenge the physical and mental abilities of the participants within a group. In most instances, group members must use teamwork, planning, and determination to complete a task. A few initiative games require special props and settings, while most can be done anywhere and without special equipment.

COPE and climbing instructors can use an initiative game to challenge the group to figure out how it will solve a problem. The group must find a solution through planning, practice, initial failures, and final achievement. The initiative game encourages learning by doing. Participants learn through trial and error. Initiative games are extremely useful for enhancing the trust, responsibility, and self-esteem of each participant. The games also promote interaction by requiring team members to cooperate, taking advantage of each group member's abilities as well as dealing with any personal variables such as height, strength, and so on. Initiative games are particularly helpful for developing participants' awareness of the decision-making process, of leadership versus followership, and of the obligations of each member of a group that is confronted with problems to solve.

Initiative games are very useful for helping facilitators gain insights into group dynamics and learn the characteristics of individuals within the group. Many times these activities can help a skilled facilitator learn about the group and adjust the program for the day to increase its effectiveness. Various storylines can be tried with setups for initiative games to determine which ones will work with the particular group. It is very important for facilitators to pay close attention to what goes on during the initiative games so that valuable information about the group does not escape their attention.

Toss-a-Name

Challenge and Objective

Participants will learn to recognize other members of the group by their *adventure names*—positive names that help participants feel good about themselves.

Equipment Needed

Tennis balls or bean bags

Setup and Inspection of the Event

N/A

Issuing the Challenge to Participants

1. Form the group into a loose circle.
2. Holding a tennis ball, a leader begins the game by saying his or her name and then passing the ball to the person on the right. That person says his or her name ("Daring Dave!" "Mighty Michelle!" etc.) and passes the ball to the next person, and so on until the leader again has the ball.
3. Next, the leader calls out the name of someone in the circle and lofts the ball to that person. That person then calls another individual's name and tosses the ball, and so on. The leader keeps adding balls until a number are simultaneously in play. The goal of the activity is communication, not speed, thus keeping the balls from touching the ground.

Safety Precautions to Consider

Toss the ball easily rather than throwing it hard.

Closing the Event

Gather the balls.

Variations for Accomplishing the Event

- While continuing to toss the ball and call names, slowly expand the diameter of the circle.
- While continuing to toss the ball and call names, slowly contract the circle until the group is so close that the game dissolves into laughter.
- After the names begin to flow, have the catcher thank the thrower by name.
- If participants already know one another's names, they can choose nicknames to be used for the duration of the game or their time on the COPE course.
- At the end of the game, challenge participants to give the name or nickname of every other person.
- Add balls or other soft objects to toss until multiple objects are in rotation.
- See how fast the group can toss an object so that each person touches it once.

Have You Ever . . .?

Challenge and Objective

An instructor asks questions of participants. Each participant who answers "yes" raises a hand. The instructor can ask the following suggested "Have You Ever" questions. The group gets better acquainted and the instructor learns more about the group.

Equipment Needed

Set of suggested questions

Setup and Inspection of the Event

N/A

Issuing the Challenge to Participants

If your response to the question is "yes," raise your hand. You do not have to explain anything that might be embarrassing or hurtful. The game format allows participants to say something about themselves without bragging. It also allows more reticent participants to say nothing without fear of censure.

Safety Precautions to Consider

N/A

Closing the Event

N/A

Variations for Accomplishing the Event

Gear the questions to the makeup of the group—youths, adults, corporate executives, medical personnel, college students, camp staff members, etc.

Suggested Questions for Have You Ever . . . ?

Become a First Class Scout?

Become an Eagle Scout?

Climbed a mountain?

Gone on a rafting trip?

Ridden a horse?

Attended long-term (at least five nights and six days) Boy Scout camp?

Participated in COPE?

Participated in a COPE high-course event?

Gone spelunking?

Rappelled from a tower or cliff?

Helped someone in need?

Done a conservation project?

Not given in to group pressure?

Been a patrol leader?

Been a senior patrol leader?

Helped a younger Scout prepare for an outing?

Climbed a wall, tower, or rock face?

Gone snow camping?

Slept in a snow cave or snow shelter?

Been lost?

Participated in an orienteering event?

Gone on a canoe trip?

Paddled a kayak?

Reported someone who was doing something wrong?

Been on a Philmont trek?

Been to the Florida Sea Base?

Been to the Northern Tier National High Adventure Base?

Been to the Summit Bechtel Family National Scout Reserve?

Gone scuba diving?

Gone on a wilderness trek?

Camped in the desert?

Identified five constellations?

Identified 15 trees?

Participated in a recyclables collection?

Cooked a meal from scratch?

Caught a fish?

Seen a bear in the wild?

Earned the 50-Miler Award?

Hiked a historic trail?

Skied downhill?

Skied cross-country?

Done the Mile Swim?

Rescued someone?

Gone hunting?

Fired a shotgun?

Counseled someone about inappropriate behavior?

Done 10 pull-ups at one time?

Done 20 push-ups at one time?

Run a race longer than a mile?

Given a speech?

Recruited a new Scout?

Contributed money to a worthy cause?

Helped someone make new friends?

Moonball

Challenge and Objective

The group stands in a circle and hits the ball, keeping it aloft as long as possible before it hits the ground.

Equipment Needed

Several well-inflated beach balls, 24 inches or larger in diameter

Setup and Inspection of the Event

N/A

Issuing the Challenge to Participants

1. A player may not hit the ball twice in succession.
2. After a few minutes of practice, challenge participants to see how many times they can strike the ball without catching it or letting it hit the ground. Participants call out letters of the alphabet, in order, with each hit. Can they run through the entire alphabet?
3. Count 1 point for each hit. Have groups of six to 10 people gather in different areas of the field or gym and begin playing. Tension and expectation may build as each "world record" is approached.

Safety Precautions to Consider

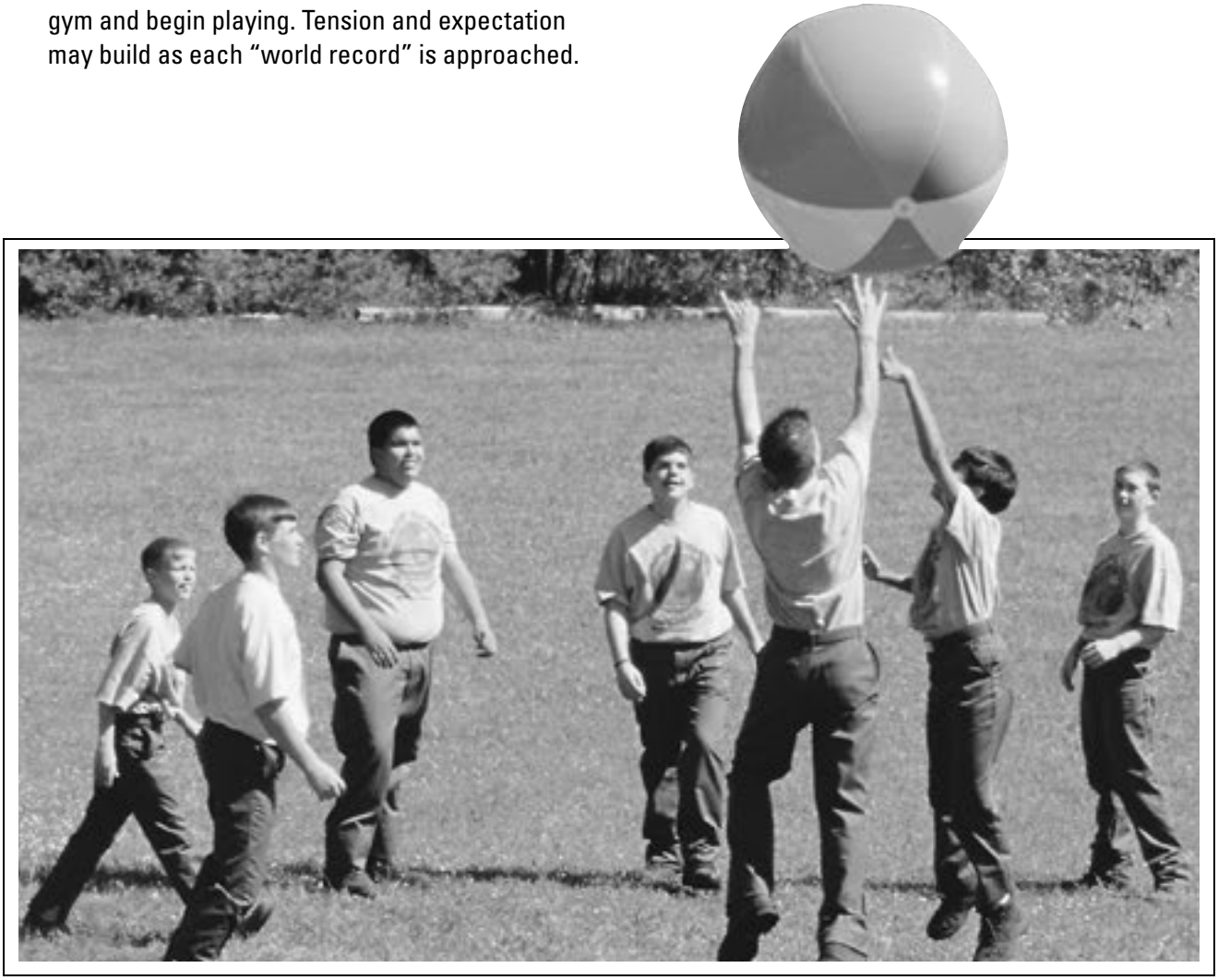
Clear the area of obstructions and debris.

Closing the Event

If necessary, deflate the beach balls.

Variations for Accomplishing the Event

- Have each person strike the ball one time. No one may hit the ball a second time until every player has hit the ball at least one time.
- Put several balls into play at the same time.
- See how fast everyone in the group can strike the ball one time without letting it hit the ground.



Sightless Height Alignment

Challenge and Objective

While blindfolded or with eyes closed, group members must align themselves according to height. Participants will become acquainted with one another and start working together as a team.

Equipment Needed

A blindfold for each participant

Setup and Inspection of the Event

Blindfold group members and instruct them to align themselves according to height.

Issuing the Challenge to Participants

1. No one may talk.
2. Blindfolds must remain in place.

Safety Precautions to Consider

- Ensure that the area is free of obstructions.
- Instruct blindfolded participants to keep their hands out in front of their bodies at all times to act as protective "bumpers" during the activity.

Closing the Event

Collect the blindfolds.

Variations for Accomplishing the Event

- Have group members align themselves from the center out with the tallest person in the center, the next tallest individuals on either side, and so on.
- Have group members arrange themselves in order by date of birth.
- Have group members arrange themselves by color of eyes, number of siblings, size of feet, or some other criterion.

Sightless Square

Challenge and Objective

A group of at least eight sightless participants holding onto a rope must form a perfect square.

Equipment Needed

- A rope, 40 to 75 feet long. The ends may be tied together to make the activity less difficult, or left untied to allow the group more options for solving the problem.
- A blindfold for each participant.

Setup and Inspection of the Event

N/A

Issuing the Challenge to Participants

1. Participants begin by forming a circle while grasping the rope with both hands. Next, blindfold the participants, and ask them to form a square. When they believe the square has been formed, have them hold their positions while they drop the rope and remove their blindfolds.
2. After they have been blindfolded or closed their eyes, all participants must keep at least one hand on the rope.
3. Blindfolds must stay in place until the COPE instructor announces that they may be removed.

Safety Precautions to Consider

- Clear the area of obstructions.
- While sightless, participants must move cautiously to avoid injury.
- Participants losing their grip on the rope should put up both hands as protective "bumpers" for the duration of the activity.

Closing the Event

1. Secure the rope.
2. Gather the blindfolds.

Variations for Accomplishing the Event

- Form a triangle.
- Form a pentagon.
- Form a circle.

Hoops Around the Circle

Challenge and Objective

The group stands in a circle, grasping hands. Two participants rest a plastic hoop on the backs of their grasped hands, then the entire group causes the hoops to travel around a circle as quickly as possible by stepping through the hoop without releasing hand grips.

Equipment Needed

Plastic hoops

Setup and Inspection of the Event

N/A

Issuing the Challenge to Participants

1. Break the circle and place two or more hoops in the circle with only one hoop between any two participants.
2. Once the game begins, the circle cannot be broken.

Safety Precautions to Consider

N/A

Closing the Event

Gather the hoops.

Variations for Accomplishing the Event

- Participants form a line and grasp the hand of the person directly in front who has placed one hand between the legs. Without releasing their grasp, participants maneuver a hoop over each person from one end of the line to the other and back again.
- Rotate two or more hoops around the circle in the same direction.
- Rotate hoops in opposite directions, using slightly smaller hoops (in diameter) in one direction.

Hug Tag

Challenge and Objective

Play tag in the usual way with the exception that a participant may avoid being tagged by hugging another player and humming. Once out of breath, however, that participant must find another partner to hug, and may safely stay with each new partner only for the duration of a one-breath hum.

Equipment Needed

N/A

Setup and Inspection of the Event

N/A

Issuing the Challenge to Participants

1. Define the boundaries of the playing field.
2. Pick one person from the group to be the tagger.
3. The game ends when only two people are left untagged.
4. A person can hug another participant no longer than the duration of one humming breath, then must move to another partner.

Safety Precautions to Consider

Clear the area of obstructions.

Closing the Event

N/A

Traffic Jam

Challenge and Objective

Using only "legal" moves, two groups of at least four participants must exchange places on a line of squares. All members starting to the left of center should end up on the right, and all members starting to the right of center should end up on the left.

Equipment Needed

Enough cloth, plywood, or cardboard squares for each participant, plus one additional square.

Setup and Inspection of the Event

1. Place the squares an easy step from each other in a straight or slightly curved* line, with one more square than the total number of participants.
2. Have one group stand on the squares to the left of the unoccupied center square; the other group stands to the right. Both groups face the middle. Use a fair method, such as flipping a coin, to determine which side will make the first move.

*The arced version allows participants to see what is happening.

Issuing the Challenge to Participants

1. Individuals may move to an empty space in front of them.
2. Individuals may move to an empty space around one person who is facing them.
3. Backward moves are illegal.
4. Any move around someone facing the same direction as the mover is illegal.
5. Only one person at a time may move.

Safety Precautions to Consider

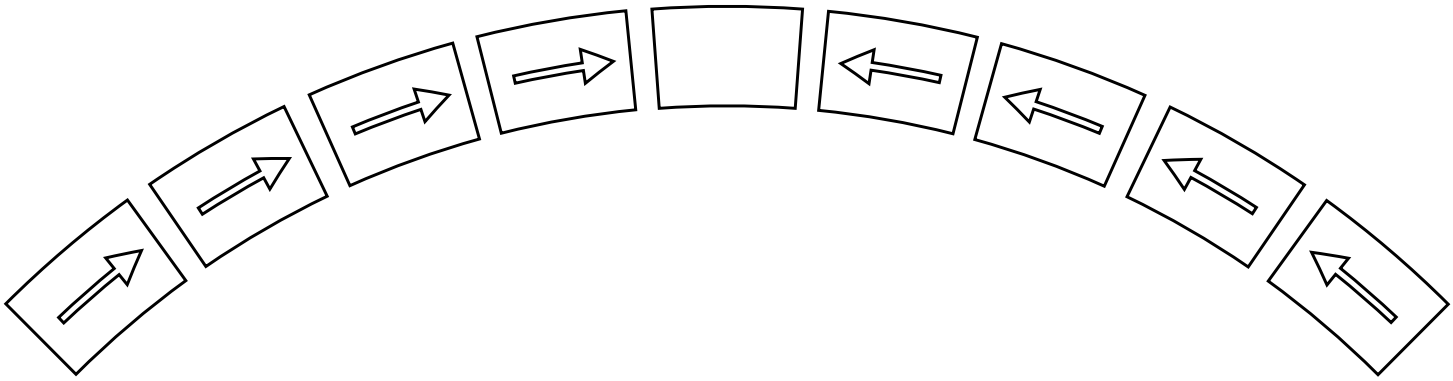
Clear the area of obstructions.

Closing the Event

Gather the squares.

Variations for Accomplishing the Event

- Conduct the activity in silence.
- Set up a second Traffic Jam perpendicular to the first. Both lines must share the one empty space. (This is referred to as the "gridlock" version of the challenge.)



Tangle Knot

Challenge and Objective

A group must create a human knot by grasping hands. Players must then untangle the knot without losing contact with each other's hands.

Equipment Needed

N/A

Setup and Inspection of the Event

N/A

Issuing the Challenge to Participants

1. Have a group of 10 to 13 people form a tight circle facing inward.
2. Have each person extend both hands into the center of the circle and grasp the hands of two other people, but not the hands of an adjacent person. Challenge players to untangle the knot.
3. Hand-to-hand contact may not be broken to untangle the knot. Grips may change and palms may pivot on one another, but contact must be maintained.
4. When the knot has been untangled, the arms of some individuals may be crossed. This is an acceptable solution to the challenge.

Safety Precautions to Consider

Perform in an area free of obstructions.

Closing the Event

N/A

Variations for Accomplishing the Event

- Form the knot by having each participant hold a 12-inch length of rope in the right hand, and then with the left hand grasp someone else's rope. This variation may be a bit safer than the nonrope version.
- If time is running out, the problem can be simplified by breaking one grip and asking the group to form a single line instead of a circle.

All Aboard

Challenge and Objective

A group of 12 to 16 people must all get onto a 2-foot-square platform so that no one is left touching the ground long enough to recite the Scout Law.

Equipment Needed

- One 2-foot-square platform
- One 18-inch-square platform
- One 12-inch-square platform
- One 6-inch-square platform

Setup and Inspection of the Event

1. Place the platform in an area clear of any obstacles that could injure a person who falls.
2. Check the platform for sturdiness and any hazards such as protruding nail heads.

Issuing the Challenge to Participants

1. At the end of the challenge, everyone must be off the ground without any part of anyone's body touching the ground.
2. Everyone in the group must remain on the platform long enough to recite the Scout Law (about five seconds).
3. Participants cannot lie on top of each other to form a pile.

Safety Precautions to Consider

- Participants may not be on the shoulders or back of another.
- Facilitators should spot the group.

Closing the Event

Place the platform in a secure area.

Variations for Accomplishing the Event

Use smaller platforms.

TP Shuffle

Challenge and Objective

Half of a group will stand on each end of a pole or log that is lying on the ground. Without touching the ground, the two parties must change ends as quickly as possible.

Equipment Needed

A 30-foot utility pole or log anchored so that it will not roll

Setup and Inspection of the Event

1. Check the condition and stability of the pole.
2. Divide the group in half and position players on opposite ends of the pole.

Issuing the Challenge to Participants

1. All members of each team must be on the pole or log throughout the challenge.
2. No part of anyone's body may touch the ground.
3. Assess a time penalty for every touch of the ground.

Safety Precautions to Consider

- Ensure that the pole is stable.
- Facilitators should spot the group.

Closing the Event

N/A

A-Frame Shuffle

Challenge and Objective

A group of six participants must move the A-frame apparatus, with one group member on board, from point A to point B (about 30 feet) using five sling ropes, each about 18 feet long.

Equipment Needed

- A-frame
- Five 18-foot ropes

Setup and Inspection of the Event

1. Mark the start and finish lines.
2. Inspect the A-frame and ropes.

Issuing the Challenge to Participants

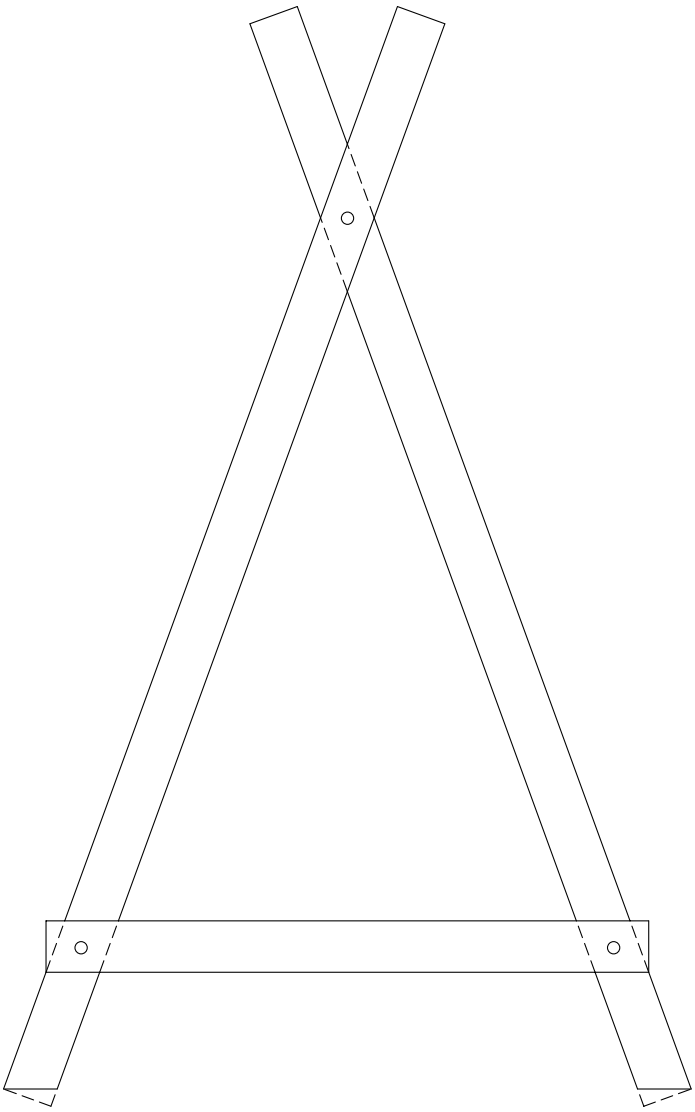
1. The A-frame must maintain at least one point of contact with the ground at all times, and never more than two points of contact.
2. Only one person can make bodily contact with the A-frame apparatus, while avoiding contact with the ground.
3. Other participants must stay at least 10 feet from the A-frame when it is in use. Instructors can explain that this 10-foot minimum is necessary because of the "radiation hazard" involved with an A-frame of this sort.
4. The ropes may not touch the ground between the start and finish lines.

Safety Precautions to Consider

- Brief participants on the possibility of the A-frame tipping over.
- Tie an overhand knot in each rope 10 feet from the A-frame. Instruct participants not to get any closer to the A-frame than the knot.
- A helmet is recommended for the participant on the A-frame.

Closing the Event

Secure the ropes and the A-frame.



Inventor's Machine

Challenge and Objective

A team of three people devises a human "machine" that can move a designated distance.

Equipment Needed

N/A

Setup and Inspection of the Event

Organize the group into teams of three.

Issuing the Challenge to Participants

1. No more than two legs and two arms of each team may touch the ground at any time.
2. Only one machine at a time will be allowed to move down the course.
3. If a machine breaks down en route, that team must wait until all other teams have had a try before making a second attempt.
4. Once a machine has successfully covered the designated distance, that team will be given a "patent" on its design, and no other team may copy that exact machine.

Safety Precautions to Consider

A team may stack only a maximum of two people high.

Closing the Event

N/A

The Monster

Challenge and Objective

A group of eight to 12 people forms a "monster" that must move a distance of 15 to 20 feet.

Equipment Needed

N/A

Setup and Inspection of the Event

N/A

Issuing the Challenge to Participants

1. No more than half of the legs of the group and half of the arms, plus one arm or one leg, may touch the ground.
2. All group members must be connected to form the monster.

Safety Precautions to Consider

Clear the area of obstructions.

Closing the Event

N/A

Trolley

Challenge and Objective

A group of eight to 12 people must move a prescribed distance (the "ravine") as quickly as possible while standing on movable wooden rails (the "trolley").

Equipment Needed

Two 4-by-4-inch beams, each 10 to 12 feet long and each having a 2½-foot length of rope attached to it every 12 inches

Setup and Inspection of the Event

1. Mark the start and finish points.
2. Inspect the condition of beams and ropes.
3. Place the trolley at the start point.

Issuing the Challenge to Participants

1. Restrict players from placing trolley sections end-to-end or on top of one another.
2. Once on the trolley, participants may not touch the ground.
3. Assess a time penalty whenever a participant falls off the trolley.

Safety Precautions to Consider

Use a smooth, level area for this event.

Closing the Event

Secure the trollies.

Variations for Accomplishing the Event

- Traverse the course backward.
- Add a third trolley.
- Blindfold, mute, or face some of the participants in the opposite direction.

Punctured Drum

Challenge and Objective

Given a 55-gallon drum with many holes in it, a bucket or other container, and an easily attainable source of water, a group must fill the drum until it overflows.

Equipment Needed

- A 55-gallon drum, preferably plastic, punctured with 120 holes
- A bucket
- A water source

Setup and Inspection of the Event

1. Place the drum in an area free of obstructions and near a water source.
2. The number of holes may vary with the size of the group. If a group is small, plug some of the holes with duct tape.
3. Check the holes for sharp edges that could injure a participant.

Issuing the Challenge to Participants

1. Participants may use only parts of their bodies to plug the holes.
2. Participants may not move the 55-gallon drum.

Safety Precautions to Consider

The holes in the drum should not be so large as to allow fingers to be inserted into them.

Closing the Event

Secure the drum.

The Blind Maze

Challenge and Objective

Participants are instructed to keep their eyes closed and follow the multiline from start to finish through a maze of various lines, some of which lead in the wrong direction.

Equipment Needed

- 300 to 500 feet of ⅜-inch multiline or discarded climbing rope, properly marked
- A small bell

Setup and Inspection of the Event

1. Run the multiline from tree to tree about 3 feet off the ground so that someone in a wheelchair can grasp it. The multiline may be simply wrapped around each tree to keep the multiline in place. Place the bell at the end of the element.
2. Put this element in a remote area where people or wildlife will not run into it in the dark, or take it down after each use.
3. Install this element on relatively level ground so that participants are unlikely to fall.
4. Remove large rocks, deadfall, and other debris from the area where the multiline is installed.
5. Avoid areas with flying insects, ants, ticks, or poison ivy, poison oak, or stinging nettles.

Issuing the Challenge to Participants

1. While keeping their eyes closed, participants are to maintain contact with the multiline from start to finish.
2. Let participants see the beginning of the maze, before they close their eyes.
3. The game ends when one or all participants reach the finish.

Safety Precautions to Consider

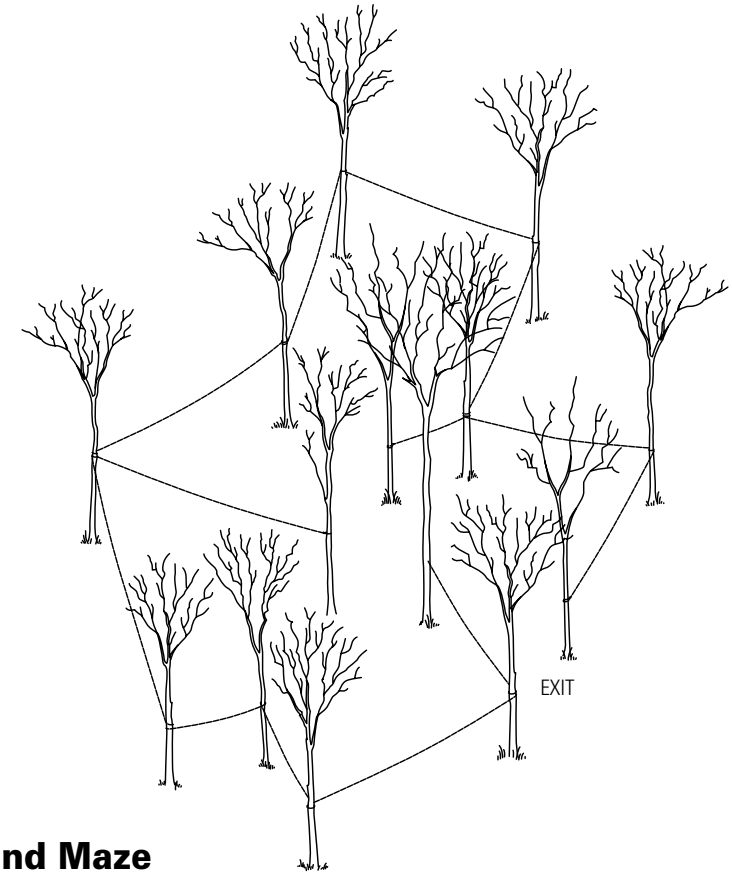
- Clear the area of obstructions.
- Remove all widowmakers (dead overhead limbs or standing dead trees).
- Check the area for insects or poisonous plants.

Closing the Event

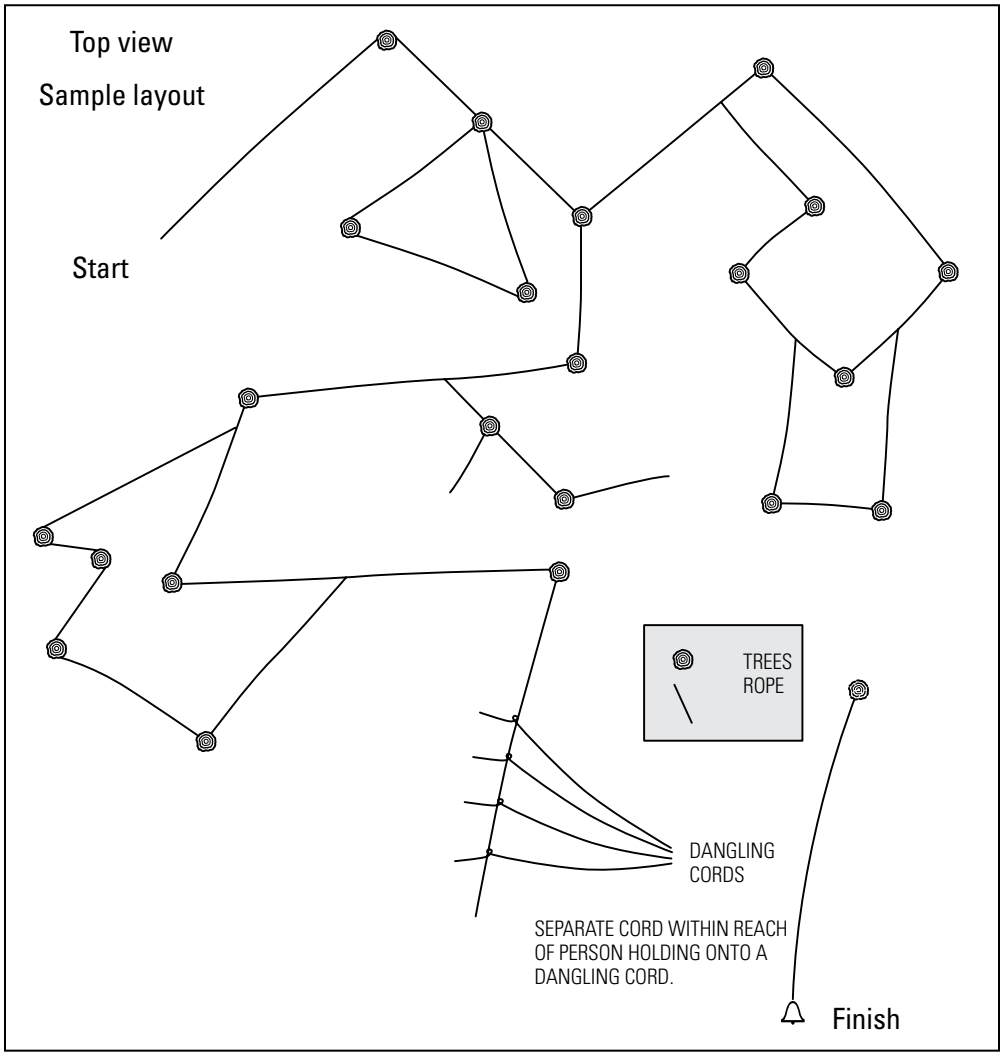
Remove the multiline.

Variations for Accomplishing the Event

- Have participants do this activity in pairs.
- Don't let participants speak or allow only a few participants to speak.
- Set up an easy and a more difficult event.



The Blind Maze



Stepping Domes

Challenge and Objective

Each participant steps across a series of hard plastic domes without touching the ground or floor. Every "dome" must be touched by both feet. The idea is to teach participants how to balance and to learn some of the basic moves for climbing. This is a great indoor activity for a rainy day.

Equipment Needed

A set of 24 to 48 hard plastic domes, about 8 inches in diameter and 3½ inches high (Provide about six domes for every three participants.)

Setup and Inspection of the Event

1. Inspect each dome to make sure it is not cracked.
2. Place the domes on level ground and position them a comfortable stepping distance apart.

Issuing the Challenge to Participants

1. Start by having each participant in turn step across a series of five to seven domes.
2. When participants have demonstrated success, space the domes a little farther apart.
3. Next, lay the domes out in a zigzag pattern, causing participants to shift their weight from one foot to the other.
4. Then place a tennis ball or other easily grasped object near one of the domes so that participants must squat down while maintaining balance on the domes.
5. Finally, place a more difficult item to grasp a little farther away from the domes so that participants must reach for it while maintaining balance on the domes.

Safety Precautions to Consider

- Clear the area of obstructions.
- Have participants test to see that their footwear will not easily slip while stepping on the domes.
- Use spotters as needed.
- Avoid muddy or damp areas that could cause players to slip and fall.

Closing the Event

Collect the domes.

Variations for Accomplishing the Event

- Have participants begin from opposite directions and cross in the middle of the domes series.
- Allow participants to help one another across the domes.
- Set up several series of domes with varying difficulty, and let the group choose its challenge.

Additional Games:

Loose Caboose: Form teams of three or four players. Players line up one behind the other as in a "train," with hands on the waist of the person in front of them. Designate about three "loose" players who try to hook onto the back of a train. If a loose player successfully latches onto the train, the person at the front of that train becomes "loose."

The Mating Game: Each player is shown a card with the name of an animal, insect, or bird. One other player is shown the same card so that there are two of the same species in the group. On the "go" signal, players mimic the sounds and movements of their species in order to find the other of their species.

Octopus: Create a rectangular boundary with two end lines. On a signal from the person designated as the "octopus," the group runs from one end to the other, trying not to get hit by two foam rubber balls thrown by the octopus. Players who get hit become stationary octopi and try to tag people as they run by.

CHAPTER 4

Spotting

Spotting is the process of breaking a person's fall in such a way as to prevent injury to both the person falling and the person spotting. In general, spotters should assume a stable stance with one foot forward of the other and with knees and elbows bent to absorb shock from a potential fall. Palms should be slightly cupped and fingers pressed tightly together (known as "using spoons") to avoid injuries to fingers.

Spotters are not expected to catch a falling person in midair—something that is nearly impossible even with a fall of only a few feet. Instead, spotters should support the upper body of a falling person, especially the head and neck, and ease that person to a safe position.

Spotters should always be used in the following situations:

1. Low-course activities—This is the primary means by which a group manages safety on low challenge events.
2. Bouldering—At least two spotters should be positioned to support the head, neck, shoulders, and torso of a falling bouldering participant. Use crash pads when possible.
3. Climbing—Because climbing rope stretches, spotters should always be used while climbers are close to the ground or vulnerable to falls on uneven surfaces.

ABCD METHOD

Climbers and facilitators should practice the ABCD method when spotting.

Attitude—Check your attitude and the attitude of other group members. Make sure all spotters are focused on the participant at all times. Avoid large weight discrepancies between participant and spotter.

Body Posture

- Spotting posture—Keep your feet stable with knees and elbows bent, and use your spoons. Keep your hands as close to the participant as possible to minimize acceleration in the event of a fall. Focus on the participant's back and help the participant land on his or her feet when possible.
- Falling posture—Teach participants how to fall safely. Challenge course events such as the Trust Fall have very specific procedures, but you should also discuss falling with climbers. In many cases, injury can be prevented by relaxing or by compressing and rolling. Spotters should be aware that falling participants often reach out with their arms to reduce rotation and should be prepared to dodge the blow.

Communication—Each person involved must communicate his or her readiness.

Participant	Spotters	Meaning
"Spotters ready?"		"I'm ready to start."
	"Ready"	"We're ready to protect you."
"Climbing!"		"I'm starting."
	"Climb on."	"Go ahead."
"Falling!"		"I'm going to fall; get ready to catch me."

Decision making—Each person must decide to be consistently safety conscious and deliberately focus on the participant throughout the activity.

Spotting techniques may vary considerably from one challenge course activity to the next. Specific procedures for spotting each element should be explained to participants prior to engaging in the activity. The traditional spotting posture where spotters stand with elbows bent, knees bent, and palms forward with fingers together may work well for activities where the participant is traversing a cable or log; however, that posture may not be very effective for activities involving swinging. On some activities, to allow everyone in the group to participate simultaneously, Step Off Safely (SOS) might be used. This technique allows participants to step off of the element onto the ground and quickly step back onto the element without any penalties when they feel they are losing their balance.

CHAPTER 5

Dealing With Fear

Fear can be both good and bad: good in the sense that it keeps us alive by stopping us from doing things that put us in danger and bad in the sense that it can keep us from growing by discouraging us from taking prudent risks. The goal is not necessarily to eliminate a fear but to control it rather than having the fear control us.

Fear is a normal human emotion that is usually accompanied by some characteristic behaviors. Biologically, these behaviors (increased heart rate, sweating, or goose bumps) are a response to danger as part of the "flight or fight" response in mammals. For many humans, fear is actually exhilarating and enjoyable—hence the popularity of thrill rides, horror movies, and high-adventure activities.

Fear can be controlled by breaking larger problems or challenges into smaller ones. For example, when climbing a tower wall, don't focus on the top of the tower. Instead, focus on the next climbing hold and then the next one and so on. Before you know it, you'll be at the top of the tower! Big challenges can seem overwhelming; however, those big challenges are really made up of many small challenges. Concentrate on the small challenges or goals as a way to overcome the larger challenges.

For some COPE and climbing participants, the thrill of fear is the real attraction of the program. Many COPE events are designed to present the perception of danger while in reality they are very safe. In certain participants, however, some events may produce a level of anxiety that is far beyond enjoyable. These participants may become so uncomfortable and distressed that the event, or even the entire activity, becomes a negative experience. We often associate fear with physical circumstances, but this assumption is not always correct for the challenge course experience. Learners may hesitate or become anxious about participating with the group in activities involving closeness or sharing or change, which may indicate a form of fear. Participants, particularly youth, may also fear appearing foolish, inept, or "looking like a jerk" in front of their peers.

To identify fear, anxieties, and hesitation, watch for these common indicators:

- A participant may undergo changes in attitude and personality.
- A participant seems to always be the last or the first in the group to volunteer. Or the participant may display the opposite extreme by withdrawing and not volunteering or contributing at all.

- The participant may become pale, stutter, or shake, or become quiet and withdrawn.
- An uncharacteristic behavior for a person may indicate fear and the attempt to mask it. Watch for excuses such as “I don’t want to get my clothes dirty” or “I forgot my gloves.”
- The participant may attempt to delay action by asking lots of questions, such as, “How high is that?” or “How does it work?”
- The participant may avoid eye contact by keeping his or her head down, looking away when you talk, or walking around the fringe of the group to discourage contact and conversation. The opposite action—overactive joking and horseplay—may also indicate an attempt to hide fear.
- A sudden, strange illness or injury may be fear-invoked to avoid participation. If the illness or injury is not obvious, ask the participant to remain in the area as an observer. It is amazing how often the illness goes away when the learner gets caught up in the excitement of the activity.

THE COMFORT ZONE, EDUCATIONAL ZONE, AND DANGER ZONE

Most people are comfortable on a couch watching television. A different person, a window washer, is comfortable on a platform 200 feet in the air. Another person, a heart surgeon, is comfortable holding a beating human heart in his or her hand.

We all have different levels of comfort. We have different comfort zones throughout our life.

Comfort Zone

There is very little learning that takes place in the comfort zone.

Educational Zone

To learn, we need to go slightly out of our comfort zone.

By taking small, repeated steps into the educational zone, we expand our comfort zone. In the educational zone, we have a heightened awareness, but reason, logic, and learning are still allowed to dictate behavior.

In COPE and climbing programs, the educational zone has a component of perceived risk; however, safety procedures are always in place to protect the participants. It is not unusual for participants to experience anxiety or fear while operating in the educational zone.

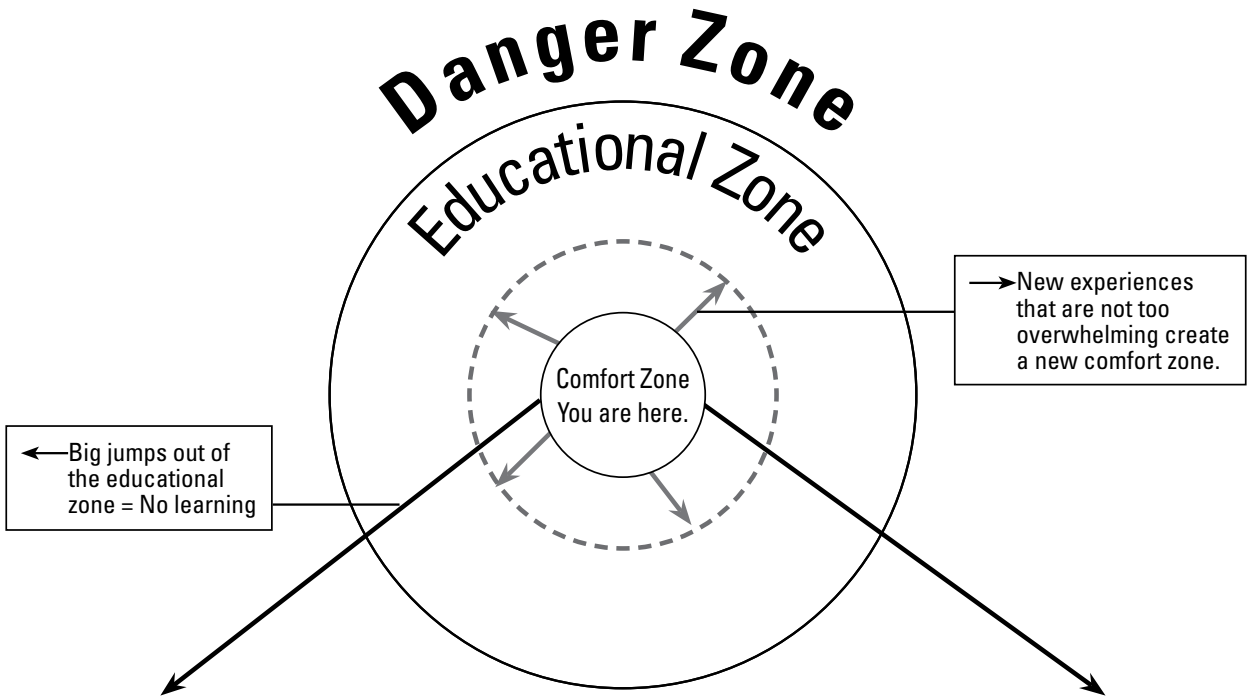
Danger Zone

Glazed eyes. No interaction. No common sense. No acknowledgment.

These symptoms indicate someone has entered the danger zone. No learning takes place in the danger zone. There is no decision making and no rationale. It is time to help this person take a slight step back to the educational zone. An example of this would be a person who freezes on a high event or climbing wall and won't acknowledge anyone.

Resolution of this occurrence requires incident resolution, which is covered in chapter 13, "Emergency Preparedness."

> **"If you have butterflies in your stomach, the goal is not necessarily to get rid of them, but to get them to fly together in formation."**
>
> —Author unknown



CHAPTER 6

Effective Teaching Using EDGE

A very important part of COPE and climbing programs is effective teaching of critical skills such as spotting and belaying techniques. Each instructor needs to master the skills of effective teaching in order to ensure that these programs are operated safely. When designing an activity to teach an important skill, it is helpful to understand how others learn.

LEARNING STYLES

Learning styles have been described using several different models. Any of these models tend to oversimplify the process of human learning but can be of value to help understand how people engage in the process of learning. One such model, discussed in "Learning Styles and Strategies" by Richard Felder and Barbara Soloman of North Carolina State University (http://www4.ncsu.edu/unity/lockers/users/f/felder/public/ILSdir/styles.htm), describes learning styles using four dichotomies:

- Active vs. Reflective—Active learners may prefer "hands-on" learning activities, while reflective learners might like some time to think things through before jumping into learning tasks.
- Sensing vs. Intuitive—Sensing learners may prefer to learn using well-established procedures and facts, while intuitive learners may dislike repetition and prefer innovative approaches to learning.
- Visual vs. Verbal—Visual learners seem to learn best from maps, charts, diagrams, demonstrations, and other visual methods, while verbal learners may prefer learning methods involving words, whether spoken or written.
- Sequential vs. Global—Sequential learners may prefer learning methods where information is explained in linear steps beginning with details and moving to larger concepts, while global learners may prefer to see the "big picture" or key relationships first and then see how the details fit in.

Felder and Soloman's paper is aimed at college students, but also provides some insights into the teaching situations frequently encountered in COPE and climbing programs. The teamwork-focused setting of these programs provides natural opportunities for active learners to get their hands on the materials quickly while the reflective learner can take advantage of the time to process the information first before trying out the task. A good example of a deliberate setup is teaching team belaying (belayer, backup belayer, and "anchor person") to participants using a rotation:

1. The instructor asks for a volunteer to try belaying during the first practice session. The question may include asking if anyone has previous experience with belaying. The first volunteer will typically be an active learner, while the reflective learner may choose a more passive role such as the anchor until they have watched for a cycle or two.
2. Deliberately pausing for a moment before the exercise to go through the CHECK process may also provide insights about learning styles. The reflective learners will typically take the opportunity to watch carefully as each CHECK step is performed, while the active learners may become a bit impatient with slowing down the process.
3. The instructor watches carefully as the belayer and backup belayer perform their tasks and provides feedback throughout the exercise until both of them perform their tasks satisfactorily.
4. During the second rotation, the backup belayer takes the place of the belayer, the anchor takes the place of the backup belayer, and the teaching cycle is repeated.

This method accommodates both learning styles and also provides valuable information about learning style preferences of the participants. Using the same teaching example, accommodations for the other learning styles can be made as well:

- Verbalizing while providing a visual demonstration of the belaying process is helpful for engaging both verbal and visual learners at the same time. It is important that everyone is able to hear and see the demonstration for it to be effective.
- Intuitive learners may want to understand the physical principles of friction devices, while the sensing types will want to see and feel how the friction device actually works.
- Describing and demonstrating the complete belay cycle will help global learners understand how the details fit together to make the process successful, while the sequential types will want to go through the process step by step with an explanation of the critical parts provided along the way.

THE EDGE METHOD

It is recommended that every COPE and climbing instructor take the Trainer's EDGE course offered by their local council. The EDGE methodology is useful for teaching skills and helps the trainer to apply a more systematic approach to designing the learning experiences.

Explain

Demonstrate

Guide

Enable

The following chart from the Trainer's EDGE syllabus identifies the characteristics of each step of the EDGE process. The second item in the Guide stage has been added to show another method of guiding a student when poor performance during a training situation could create an unsafe situation. Examples of this might be:

- Preparing instructors to set up the zip-line trolley and send the first person down the zip line
- Belaying the first person on a climb
- Setting up the anchor system on a new climb site
- Rigging a releasable rappel

When designing training sessions, whether for other instructors or for participants, the EDGE methodology can be helpful.

Training Stage	What It Is
Explain	• Tell them (talk, audiotape). • Give written instruction or explanation (paper, book, Web page).
Demonstrate	• Show (include role plays, videos, computer animations). • Do it yourself as they watch. • Use a diagram. • Tell a story (can be fictional or real-life examples).
Guide	• Watch them do it and give verbal hints and tips. • Have them provide guidance as the instructor performs the task (particularly useful when performing the task incorrectly could result in an unsafe situation). • Do it together (at the same time). • Let them try it; then talk about it. • Let them ask questions as they try it.
Enable	• Give a memory aid. • Give them a task that requires this learning. • Ask them to teach someone the new learning. • Give them the resources to do it again without you. • Help them use the learning again in a new setting or situation.

CHAPTER 7

Safety Measures and Accident Prevention

The safety of BSA climbing and COPE participants, leaders, and staff members is paramount in the construction, staff training, and operation of a COPE or climbing/rappelling program. While there are inherent risks in climbing/rappelling and COPE activities and events just as there are in every sport and outdoor program, climbing and COPE staff members, leaders, and participants work together to ensure that the environment of a climbing site and/or COPE course is safe and that activities are conducted in ways that allow participants to be challenged but not endangered.

Concern for safety is not enough; the council and the COPE and climbing committee and staff must take action to ensure the safety of participants and staff members. Being able to trust the reliability of a climbing area and COPE course allows participants to enjoy the program fully and to learn from it. To maintain that trust, safety must be both an attitude and an objective of all climbing and COPE staff members and participants.

- Safety attitude—All climbing and COPE staff members and participants agree that safety is their highest priority. Each person is responsible for his or her own safety as well as the safety of other members of the group. No injury is acceptable, and almost all injuries are avoidable.
- Safety objective—Serious accidents or injuries on a climbing site or COPE course can be minimized. All injuries and accidents, even minor scrapes and close calls, may provide information that can help prevent them in future programs. Be sure to follow all BSA reporting and incident analysis procedures outlined in the National Camp Accreditation Program (NCAP) standards.

The potential for serious accidents and injuries is always present. Climbing areas and COPE courses are safer when the standards and recommended procedures are followed. Most injuries occur to or are caused by staff. These injuries often happen because of fatigue, inattention, being too casual, showing off, and failing to follow standard procedures and safety rules. Safety begins with an attitude that must be shared by every individual involved: *Safety is the highest priority for the program.*

This attitude must be translated into an objective to which everyone must subscribe: *Do everything possible to prevent serious accidents or injuries at the climbing site and on the COPE course.*

When human hazards and environmental hazards overlap or compound each other, chances increase for accidents to occur. Such an "accident equation" might look like this:

Human Hazards	**+**	**Environmental Hazards**	**=**	**Accident Potential**
Lack of knowledge	+	Inclement weather		
Physical exhaustion	+	Damaged equipment		
Emotional distress	+	Animals and insects		

When people combine the right attitude and awareness with the proper action, the result is a "safety equation" that looks like this:

Attitude	**+**	**Awareness**	**+**	**Action**	**=**	**Safety**
Positive	+	Knowing what can go wrong	+	Planning		
Caring	+	Supervising	+	Training		
Safety first	+	Teaching others	+	Intervention		

ACCIDENT PREVENTION

Successful climbing and COPE programs have several traits in common:

- The climbing area or course structure and setup are safe.
- Staff members and participants take ownership of a safe program.
- Staff members and participants know and follow the rules.
- Staff members and participants complete safety training for each stage of an activity.
- Staff members and participants discuss and understand how to manage hazards effectively.

There are four ingredients to the operation of a safe program: the people (personnel) who conduct it; the policies by which they operate it; the equipment used; and the environment. In this chapter, we will consider important features of each of these.

Personnel

In addition to supervisory and management duties, the Director/Level II instructors should have a specialized knowledge of the course and be able to perform the following tasks:

- During the operation of tower or high-course events, a Director/Level II instructor should wear a harness and helmet in order to respond quickly to emergencies and should not remove them until all participants and staff members are safely on the ground.
- The Director/Level II instructor must be available to respond to any emergencies on the ground or on any activity, or must assign a responsible staff member to fulfill that responsibility.
- A Director/Level II instructor should be able to identify the various pieces of hardware used at a climbing area or on a COPE course, understand their correct uses including breaking or tensile strengths, and properly care for and maintain the equipment. This knowledge can enhance the safety of a climbing area or COPE course and can increase the confidence of a Director/Level II instructor and the staff.
- The Director/Level II instructor must be able to judge when to suspend the program due to course condition, weather, staffing, or any other factor that might compromise safety.

The climbing and COPE staff members are at the front lines for providing a safe program. The following precautions will help the staff maintain safety at a climbing area or on a COPE course:

- Ensure adequate staffing for each program.
- At least one person on-site must be prepared to respond to injuries and medical emergencies that are likely to occur during program operation. It is a good practice to have staff members trained in CPR and first aid.
- Before the course is open to participants for the day, the staff must complete a course inspection according to local procedures. In this inspection, particular attention should be paid to the setup of life safety systems.
- In setting up the course, staff must keep in mind that many incidents/accidents on challenge courses occur during setup or takedown. Pay careful attention to safety in such areas as safe ladder setup.
- At the beginning of any program, the Director/ Level II instructor reviews appropriate health and safety information about participants. Staff members may be made aware of appropriate health concerns regarding any participant in order to ensure the participant's safety.
- The course begins with an environmental/safety briefing to the participants by one of the staff. This briefing is intended to highlight the importance to be placed on safety during the entire day's program.
- The staff ensures that rescue, first-aid, and communication equipment is present and in working order before the program commences. Equipment that staff is not trained to use should not be present at the program activity area.
- Staff members must model safe behavior for the rest of the group during the program. It is unacceptable for staff members to ignore the safety requirements they have set for participants.
- During the operation of a program, staff must develop the habit of utilizing the CHECK system to continually monitor harnesses, knots, belay setups, etc., even if these have been inspected previously.
- Staff members should never coerce or pressure a participant into attempting an activity. Encouragement and recognition of accomplishment may be used, but the final decision to take part in any activity or event must be made by the participant.
- Following the conclusion of a program, staff should meet to discuss the day's activities and any safety issues that may have arisen. Even if no near misses occurred during the day, there may have been

CHECK System

CLOTHING

Check for baggy shirts and jackets that could get snagged in the friction device. Check that jewelry is removed or secured to prevent interference with equipment. Check that hair is tied up or tucked inside the back of the shirt.

HARNESSES/HELMETS

Check harnesses for the following:

- Properly fitted to the participant.
- Belay rope attached as recommended by the manufacturer.
- Buckles secured per the manufacturer's recommendation. Many designs require that buckle straps be doubled back.

Check that helmets are properly fitted with chinstraps secured.

ENVIRONMENT

Check that all program areas are safe and free from obstructions and hazards. Has the ladder been moved from the end of the zip? Are people on the ground in a safe location? Does the COPE platform have room to accept another participant?

CONNECTIONS

Perform a safety check on the connection between the participant and the belay system. Recheck often, and double-check when belays are changed. Perform a physical, visual, and audible check with the participant to make sure that carabiners are:

- Attached to the proper locations.
- Locked and the lock screwed down. (Remember "Screw down so you don't screw up.")

KNOTS

Check that knots are properly tied, dressed, and backed up with a safety knot.

safety concerns witnessed by staff that could be addressed in subsequent programs.

Policies and Procedures

Every COPE program should have its own site-specific set of policies and procedures. These are developed by the local council's COPE and climbing committee, which also monitors compliance. COPE and climbing national standards and this manual do not constitute a set of procedures for a program. They represent minimum standards to which programs must adhere but do not address matters that are specific to individual sites. Some of the policies that local programs must develop and monitor include the following:

- Staff training procedures, including a process for maintaining records of training and certifications
- Course-specific setup and takedown procedures, including safety requirements (e.g., full body harnesses and shock-absorbing lanyards) for staff involved in high-element setup
- Health and safety screening process
- Inspection process and documentation (including both the annual course inspections and the daily inspections of the course and its equipment)
- Use of course by non-Scout organizations or groups
- Emergency and rescue procedures (pertinent to the specific course)
- Documentation of injuries and near misses, including a process by which these are transmitted to the council's COPE and climbing committee for review

Equipment

Much of the cost of operating a climbing and/or COPE program lies in the substantial investment in equipment. Ensuring that this equipment is carefully inventoried and cared for is an obvious necessity in light of this investment. More importantly, care, maintenance, and scheduled replacement of this equipment are critical factors in the operation of a safe program.

An important prerequisite to equipment care is the availability of an up-to-date inventory. An inventory of COPE and climbing equipment must be maintained. Certain pieces of equipment (e.g., helmets, harnesses, ropes, and webbing) must be retired according to the manufacturer's recommendations. Other types of equipment (e.g., carabiners and belay devices) have no predetermined life span but need ongoing inspection to ensure safety. Such inspections are documented by the process outlined for the local COPE and climbing program. COPE and climbing equipment should not be used by other programs outside the supervision of the COPE and climbing staff. Doing so removes the equipment from a documented chain of custody to ensure its appropriate use and maintenance.

Some courses (e.g., those at summer camps) may be used only for a brief season annually. In such cases, it is critical that the council develop a procedure for the safe storage of equipment during the off-season. Similarly, it is important that custody and storage of course or tower records be maintained off-season. Simply leaving them at a closed summer camp is probably ill advised. They might be transferred to the council office for safekeeping.

With the increasing popularity of climbing gyms and challenge courses, there is an ever-expanding array of mechanical devices available for use on climbing and COPE courses. Climbers and ropes course instructors usually have their favorites, but council COPE and climbing programs should be aware of one important fact: No single piece of commercially available equipment is inherently safer than another. The important matter is that the equipment be maintained well and thoroughly understood by the staff.

Thus, rather than debate the merits of tubular (e.g., ATC) or plate (e.g., Sticht plate) belay devices, the program should decide on one type and be sure that the staff is thoroughly trained in its use. Automatic belay devices are inconsistent with climbing and COPE goals and should be avoided. As a general rule, there is merit in concentrating on equipment that is simple to understand and use; thus, tubular or plate devices may be preferred over more complex belay and rappel device equipment (e.g., Petzl Grigris).

Environment

Challenge courses are inspected annually by members of the local council and a professional inspector. All items requiring maintenance that could result in participant or staff injury should be addressed prior to use of the facility or equipment. Activity areas should be evaluated before the program begins for potential problems that could compromise safety:

- Presence of insects or insect nests
- Poisonous plants in the area where participant or staff contact might occur
- Debris, holes, or mounds on the ground that could cause tripping hazards
- Loose or hanging branches above activity areas
- Splinters, excessive roughness, splits, and other potential hazards on wood surfaces
- Sharp edges or ends on connectors or hardware where people might contact them
- Slippery surfaces (e.g., wet grass, mud, or slimy boards)

The Director/Level II instructor should keep a close watch on the weather to make sure that unsafe conditions do not occur during program operation. BSA Weather Hazards online training provides good general guidelines for all programs that can be applied to operation of COPE and climbing programs.

Lastly, it must be remembered that a few serious incidents have occurred on towers or courses because of unauthorized use. Ideally, climbing towers and COPE courses are located in areas where unauthorized access is prevented by topography, fencing, or continuous monitoring. Because this is often impossible, however, systems must be in place for disabling facilities when they are not in use. Course-specific procedures for disabling facilities must be developed and used.

Suitable warning signs must be posted at the tower and COPE site.

SAFETY GUIDELINES

ALL CLIMBING AND COPE PARTICIPANTS AND GROUP LEADERS MUST FOLLOW SAFETY GUIDELINES PRESENTED BY DIRECTORS AND INSTRUCTORS.

Clothing

- Clothing should be loose enough to permit freedom of movement but not so baggy that it could become entangled with ropes and rigging or snag on structures. Long sleeves and long pants are recommended.
- Clothing should be appropriate for the weather; layer clothing for cool or cold conditions.

Shoes

- Footwear appropriate for the activities should be worn properly.

Hair

- Tie back long hair.

Jewelry and Accessories

- All sharp objects (pens, combs, etc.) should be removed.
- Remove all jewelry that could cause injury during planned activities, including necklaces, watches, bracelets, and earrings (some programs may allow post earrings).
- No large belt buckles or scarves should be worn.

Objects in the Mouth

- No toothpicks or other objects that could cause injury or be a choking hazard should be placed in the mouth while a participant is on the course.

Directors and Level II instructors should be alert to the possibility that while on the course a participant might slip a pen into a pocket or put on jewelry. Have a personal property box to secure items that are not appropriate.

Staff Equipment and Behavior

- Staff members must wear a UIAA- or CEN-approved rock climbing helmet when in the fall zone and be prepared to direct activities in case of emergency. (The Union Internationale des Associations d'Alpinisme sets standards and testing procedures for climbing equipment.)
- Staff members must follow all safety rules expected of climbing and COPE participants. Staff members must set a good example at all times.
- Staff members should make no assumptions when it comes to safety. They must check the obvious and double-check all critical connections and belay systems.

General Safety

- Whenever a COPE course or tower is in operation, there must be a first-aid kit, a means of emergency communication on-site, and a backup means of communication (a second cell phone or radio or other means of backup).
- UIAA- or CEN-approved helmets must be worn by everyone in the fall zone of climbing sites, towers, and high-course COPE elements at all times, including during setup and takedown and while working with ladders.
- Staff members and participants must understand and follow the safety rules for towers and each COPE course element.
- Safety measures must be used for all activities. This may include but is not limited to spotting, Step Off Safely, imposing limits (e.g., restrictions on jumping, diving, and running), or other appropriate measures for the activity.
- Fall protection or belay systems must be used for anyone whose feet are more than six feet above ground (with a few exceptions such as The Wall and The Beam).
- No one is allowed on any element unless a director or Level II instructor is present and spotters or belayers are in place and ready to perform.
- Participants' heads should be kept higher than their feet.
- Because of the danger of injury, grabbing the belt or belt loops of a participant on any element should not allowed.

Guidelines for Staff Members

- Follow the local procedures for participant screening. These may vary from a health officer reviewing participant health forms in a resident camp situation to the Director/Level II instructor reviewing the self-screening on participant health forms before an off-season activity. In any case, the results of this screening must be available to program staff **BEFORE** starting the day's activities.
- Give participants an environmental/safety briefing before starting the day's activities. Ensure that the participants understand the briefing by asking a few relevant questions.
- Demonstrate spotting techniques and allow participants to practice spotting before beginning climbing or COPE course activities.
- Ensure that participants and leaders are belayed on climbing, rappel, and COPE high-course elements, and in any other situations where a significant risk of falling exists and where participants cannot be fully protected by spotters.
- Inspect anchors and carabiners at a belay site before beginning each belay.
- When serving as a belayer, check the harnesses, helmets, carabiners, belay knots, and clothing of all participants before allowing them to proceed with an event.
- Position at least one staff person near the belayers to assist in case of an emergency.
- In all emergencies, follow a written site-specific emergency plan.
- Provide continuous supervision for all participants on the tower or COPE course while they are engaged in activities.
- Follow the safety instructions described in the local operating procedures identified by the council.
- Terminate climbing area or COPE course activities when unsafe weather, high winds, or any other conditions might present a hazard to participants or staff members.

CHAPTER 8

Life Safety Systems

Life safety system: A configuration of components including lifelines, belay beams, and anchorages that support personal safety systems, belay systems, and/or rope rigging systems.

Personal safety system: A system of equipment that connects a person to an anchorage or lifeline with the intention of preventing or arresting a fall when the potential free-fall distance is less than or equal to 2 feet. Personal safety systems may include continuous self-belay, fall restraint, positioning, and suspension systems. Components of a personal safety system include harnesses, connectors, and lanyards.

Belay systems: An equipment system and corresponding techniques used to control a life safety rope connected to a participant where the rope may be taken in, let out, and secured in order to arrest a fall. Included are top-roped and team belay systems. Belay system components may include rope, connectors, shear reduction devices, belay devices, and descent control devices.

Any person more than six feet above the ground must be continuously protected with either a belay system or a personal safety system. A personal safety system is a fixed system and cannot be lowered to the ground. Examples of personal safety systems are lanyards, rabbit ears, lobster claws, cable ascenders, and the tether to a zip-line pulley. Personal safety systems typically are used for people who are stationary on platforms or are on traversing elements.

Belay systems are rope systems that can be lowered to the ground. Belays are anchored at the top of the route and are sometimes called top-roped or slingshot belays. In top-roped systems, the belayer may be positioned at the top or the bottom of the climb; however, the climber rope is always passed through the anchor at the top of the route. This eliminates the chance for significant falls. Any person more than six feet off the ground must be belayed continuously. Belays should be used on climbing events and may also be used on traversing events and rappelling.

Personal safety systems are easy to operate but can lead to more intense rescue situations. Any participant on a belay line can be simply lowered. Participants who need to be rescued while on a personal safety system might have to have their system converted to a belay system and then lowered. Climbing or rappelling using only friction knots or soloing devices for a belay are not acceptable for BSA activities.

Rappellers are belayed with an independent belay line or with a fireman's belay. A fireman's belay is a person on the ground who pulls on the rappel lines. This creates tension around the rappeller's friction device and halts the rappel. It is the same principle as the rappeller braking himself with his brake hand, only in this case it is someone else's hand and it is several feet down the rope.

Lead climbing is similar to climbing with a top-roped belay line except that climbers are continuously building new anchors as they ascend. This puts climbers in situations where they are leading out above their anchor.

PARTS COMMON TO PERSONAL SAFETY AND BELAY SYSTEMS

Harnesses

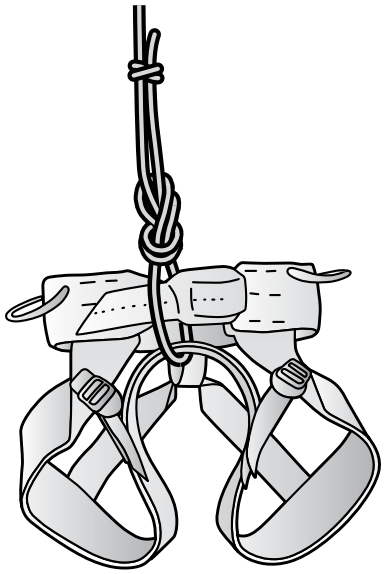
The harness is what connects a person to the rest of the life safety system. Harnesses give climbers, rappellers, and belayers a secure way to attach themselves to ropes, friction devices, and belay anchors. Climbing harnesses have evolved over the years to become as comfortable as they are safe. Harnesses are constructed with several common parts—the belt or waist band, leg loops, crotch loop, equipment loops, belay/rappel loops, and rear rated attachment point.

When a person is hanging in a harness, his or her weight is supported by the leg loops. The leg loops should be at the top of the person's thighs and support the person as if he or she were sitting on a chair. The waist belt supports very little of the participant's weight. Instead, it helps keep the participant balanced upright. The leg loops might have a crotch loop connecting them to the belt. Usually the crotch loop makes a connection point over the belt to which the rope can be attached. Harnesses without crotch loops usually have independent connection loops on the belt and the leg loops. These loops then have a belay/rappel loop that connects the two loops. The climbing rope can be either tied into the two independent loops beside the belay loop or clipped into the belay/rappel loop. Equipment loops are conveniently sewn into the waist belt and provide a place to clip gloves or equipment not currently being used. Some harnesses come with an attachment point at the back of the waist belt. These connection points are rated and allow for participants to be suspended from them. Any program that has a face-first rappel must use a harness with a rear rated attachment point. Simply clipping around the back of the harness belt is not acceptable. Always connect to the harness the way the manufacturer specifies.

Kinds of Harnesses

Commercially made harnesses are available in a variety of designs, most notably the waist-belt/leg-loop style (sometimes called "sit" or "seat" harnesses), fully adjustable, chest, and full-body style.

Waist-Belt/Leg-Loop Style Harnesses (Commercially Made Harnesses)



These are the most common commercially made harnesses and are often the most comfortable. A waist belt with a buckle closure and the leg loops are held together by a belay loop made of strong webbing. The leg loops may be adjustable and, like the waist belt, padded for comfort. The belay loop serves as an attachment point for rappel and belay devices. Follow the manufacturer's recommendation for attaching to a harness. Note that similar-looking harnesses may have different manufacturer recommendations.

Sport climbing harnesses usually have an adjustable belt but the leg loops are a fixed size. These harnesses are good for a climber's personal use but are not well suited for a BSA program because they aren't adjustable for participants of different sizes. Fully adjustable harnesses have an adjustable belt and adjustable leg loops and are well suited for BSA COPE and climbing programs.

Fully Adjustable Harnesses

Adaptable to a wide range of body sizes, the fully adjustable harness is made from a single piece of webbing that wraps around the legs and continues to the waist. Leg loops must be adjusted snugly to prevent slack from migrating to the waist.

Chest Harnesses

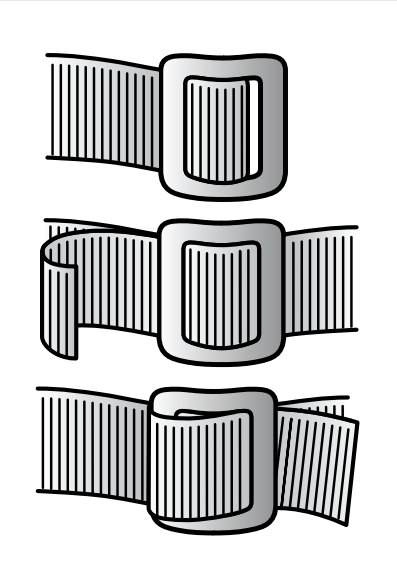
Chest harnesses are commonly used when there is a concern that a participant might become inverted in an event or in special situations—for example, when ascending or rappelling while wearing a pack. A chest harness can provide additional balance to a seat harness. Chest harnesses must always be used in combination with a tied-seat harness or a commercial harness. The belay rope is passed through a carabiner on the front of the chest harness to keep the participant from tipping over.

Full-Body Harnesses

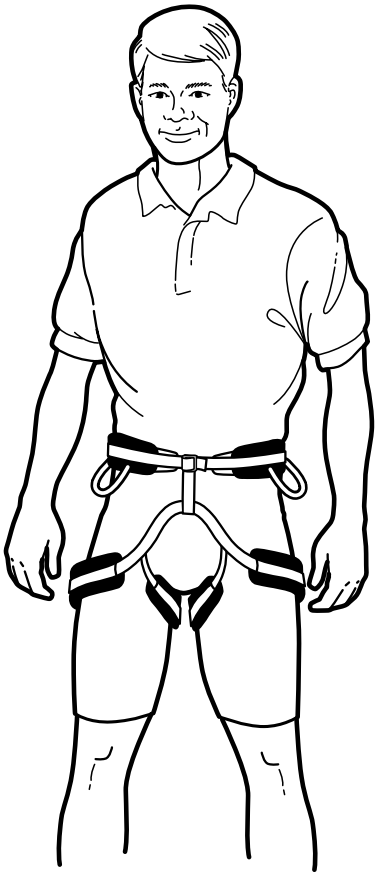
Full-body harnesses incorporate chest, back, and shoulder support. Young participants whose hips are not developed enough to hold a normal harness in place should use a full-body harness, as should any individual whose waist is too large for proper positioning of a harness waist belt.

Buckle Up!

Before allowing a person to climb, rappel, or belay, double-check to be certain that the end of the harness belt has been properly secured according to the manufacturer's specifications. In most cases, that involves threading the belt back through the buckle.



Fitting Commercially Made Harnesses



Even the most carefully designed and cushioned harness will not be secure if it is too big or too small, nor will it be comfortable. A harness that is too tight will restrict movement and can pinch. A loose harness may slip and chafe; in an inverted fall, a climber or rappeller could slide out of it. Instructors should be diligent in ensuring that every participant is matched with a harness of the correct size and that it is properly adjusted. Each participant should be trained to put on and adjust his or her own harness.

Fitting Waist-Belt/Leg-Loop Harnesses

A waist-belt harness should sit snugly above the hip bones and be impossible to pull down. A harness that is too large may slide up onto the ribs, compress the diaphragm, and interfere with breathing. A harness that is too small can compress the hips and legs, reducing mobility. When in doubt, however, err on the small side. Be thorough when testing the security of harness fit. If the harness will not stay above a participant's hip bones, it may not hold that person in an inverted fall. Instead, use a full-body harness or a chest harness in combination with a seat harness.

Safety Concerns for Harnesses

- A properly sized commercial climbing harness or a tied-seat harness made from at least 1-inch-wide webbing is required at all times when a person is on any type of belay.
- Before use, inspect visually and by touch the condition of each harness, paying close attention to belay loops, stitching, and buckles.
- Most harnesses use buckles to secure the waist belt. Harnesses must be buckled in a specific way, a process that usually requires doubling the webbing back through a buckle and leaving a tail at least 3 inches in length. If the buckle and the harness are not correctly secured, they may come apart, which can be potentially fatal. Review the manufacturer's recommendations and follow those instructions every time you buckle a harness.
- Pay special attention when using harnesses that include hook-and-loop fasteners. Considered by some climbers to be a convenience, a hook-and-loop fastener may increase the possibility of a participant forgetting to buckle a harness properly.
- Instruct each participant on the proper methods of fitting and buckling the harness.

For general guidelines on tying in to a harness with a belay rope, climbing rope, or rappel device, see the next section. For specific instructions, refer to the manufacturer's tag sewn into the harness in question.

Tied Harnesses

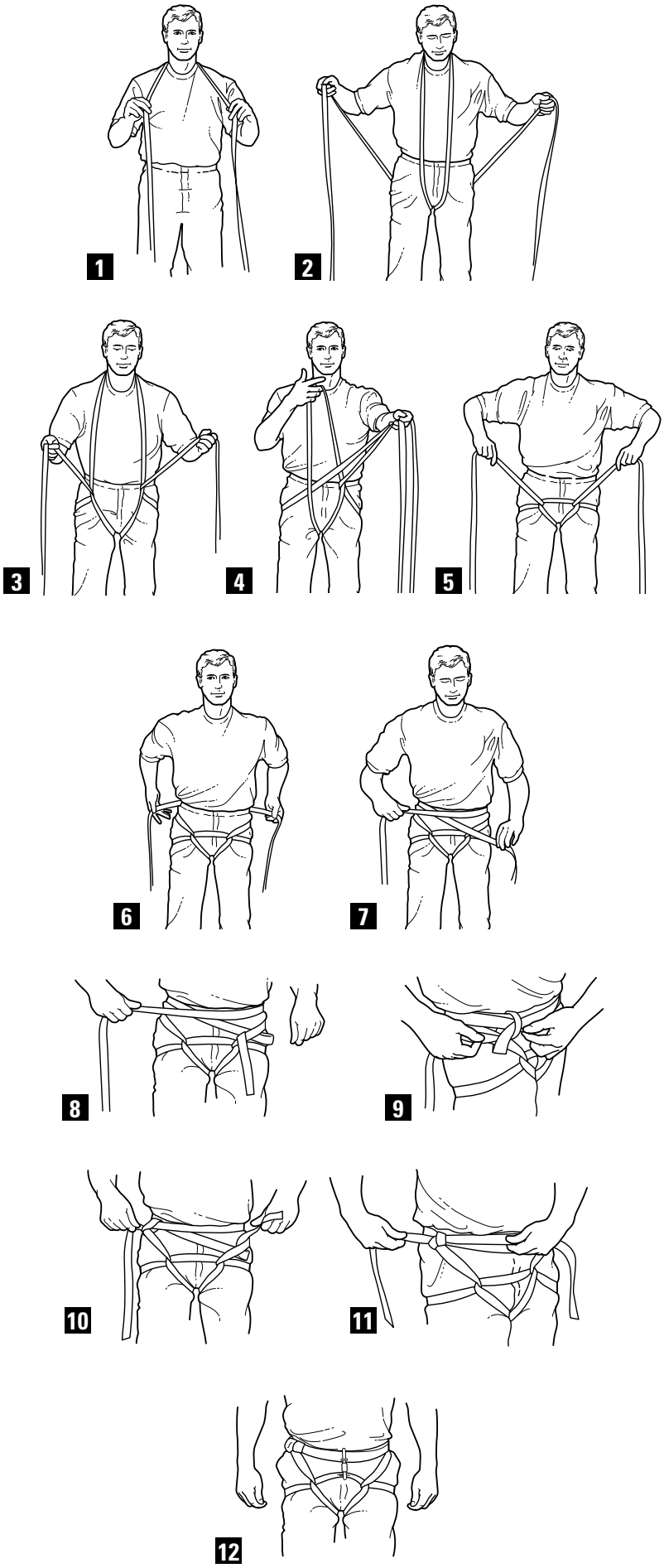
While this technique is seldom used anymore, a 30-foot length of nylon webbing can be wrapped around the body and tied in special ways to form a reliable tied-seat or chest harness for climbing, rappelling, and belaying. Common tied-seat harnesses are the Swiss seat, Studebaker wrap, diaper sling, and knotted leg-loop harness.

Commercial harnesses and tied harnesses are only as safe as the people using them. Anyone responsible for others during climbing and rappelling activities should understand how to put on and adjust the harnesses to be used at that site and should do it correctly every time. Before any climbing or rappelling activities begin, an instructor should check and double-check each person's harness to be sure it is properly fitted and secured.

How to Tie a Seat Harness

Tie the seat harness using a piece of webbing 24 to 30 feet long.

1. Drape the center of the webbing behind your neck.
2. Step over the ends of the webbing and bring them around the sides of your hips, taking care not to allow any portions of the webbing to twist. Pull the webbing snug.
3. Pass the webbing ends behind and then through the lengths of webbing lying against your lower torso.
4. Slip the webbing off your neck.
5. As you pull out the slack, the bend that had been around your neck will become the horizontal band between the loops of webbing that have formed around your legs.
6. Going first behind your back, wrap the remaining lengths of webbing around your waist in this fashion:
   a. The piece originally in your right hand goes clockwise.
   b. The piece originally in your left hand goes counterclockwise.
7. Continue wrapping until only about 3 feet remains at each end of webbing. Keep the webbing flat and snug against your body.
8. Tuck the end of the counterclockwise webbing beneath the sling on your left hip. (You will need it in a moment to finish tying a water knot.)
9. With the end of the clockwise webbing, tie a loose overhand knot (½ of a water knot) around the wraps of webbing on your right hip.
10. Retrieve the other end of the webbing and use it to trace back through the loose overhand knot, thus completing a water knot.
11. Tighten the water knot. Check the harness to be sure it fits securely and that there are no unnecessary twists in the webbing. Wrap any remaining length of webbing around your waist and tuck the end under the previous wraps.
12. Use a locking carabiner to clip together all the webbing between the knots in front of your body.



How to Tie a Knotted Leg-Loop Harness

Form the knotted leg-loop harness using a piece of webbing 24 to 30 feet long.

1 a. Holding one end of the webbing, measure off a length that stretches from your nose to your outstretched hand. Keep that length marked with one hand while you tie the first leg loop.

b. Form the first leg loop. Just beyond the measured piece, wrap the webbing around your thigh to size it to your leg. Add another 4 to 6 inches to allow for a knot, and form a leg loop with an overhand-on-a-bight knot.

c. Move about 6 inches further along the webbing and repeat step 1b to form a second leg loop.

2 With the shorter, measured piece of webbing on your left side, put on the leg loops as you would a pair of pants. Pull the loops all the way to your crotch with the knots toward the front. For the sake of comfort, be sure there are no twists in the webbing. Each loop must be snug, but not tight enough to restrict circulation. You should be able to easily slip two fingers between a leg loop and your leg.

3 Let the shorter, measured piece of webbing hang down on your left side. Bring the longer piece of webbing clockwise, behind your back, and wrap it several times around your waist. Bring the end of it across your belly to your right side.

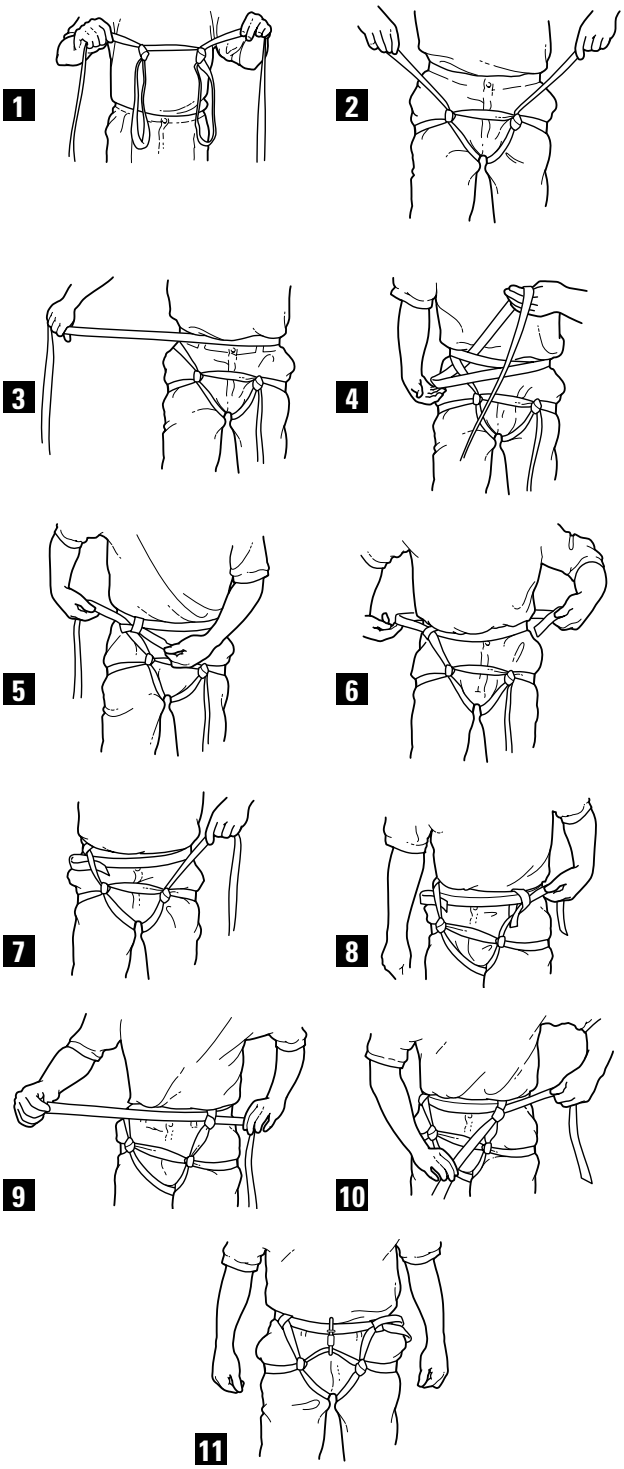
4 Tuck the webbing end up and behind the wraps of webbing on your right hip, leaving enough slack to form a bend.

5 Pass the webbing end through the bend to form an overhand knot. Work any slack out of the webbing so that the harness fits snugly around your waist and the overhand knot is secure.

6 Wrap the remainder of the longer piece of webbing a final time around your waist, going clockwise, as before. To keep it out of the way, tuck the end behind the webbing above the right leg loop. (You will need it in a moment to finish tying a water knot.)

7 Turn your attention to the shorter, measured length of webbing on your left side.

8 With the measured length of webbing, tie a loose overhand knot (½ of a water knot) around the wraps of webbing on your left hip.

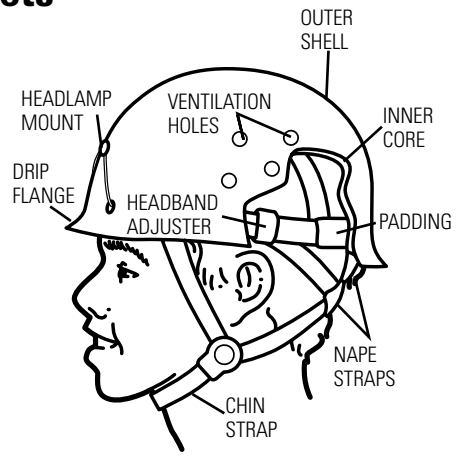


9 Retrieve the other end of the webbing and use it to trace back through the loose overhand knot, thus completing a water knot.

10 Tighten the water knot. Check the harness to be sure it fits securely and that there are no unnecessary twists in the webbing. Wrap any remaining length of webbing around your waist and tuck the end under the previous wraps.

11 Use a locking carabiner to clip together all the webbing between the knots in front of your body.

Helmets

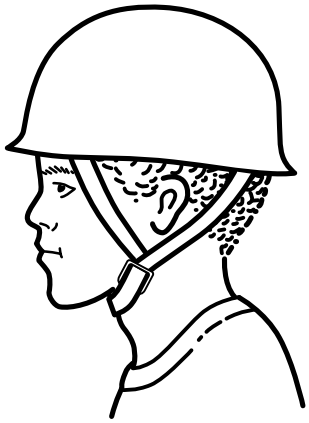


Every participant in the fall zone of any BSA climbing or rappelling activity must wear a helmet that is designed for ropes courses or climbing. Climbing helmets have suspension systems made of either webbing or foam. Other kinds of helmets such as those intended for bicyclists, skaters, construction workers, or football players are not specifically designed for climbing and are not acceptable.

Climbing helmets protect one's head from falling rocks and gear and from contact with the climbing surface. Participants may complain at times that helmets feel hot or uncomfortable, but the assurance of increased safety far outweighs any minor discomfort. Instructors should ensure that every participant's helmet is adjusted to fit properly. Never allow a helmet to be worn tipped back to expose the forehead.

When selecting helmets, consider ventilation, ease of adjustability, and color (dark colors absorb heat; light colors reflect it). A distinctive color used for the helmets of climbing instructors can help provide immediate identification. Instructors can also be identified by slipping a sunshade or piece of webbing into the headlight clips on the outside of the helmet.

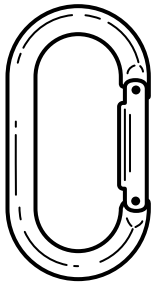
All climbing helmets must be retired according to the manufacturer's recommendations, or sooner if one shows signs of wear or sustains significant impact. Follow any additional manufacturer's guidelines for retiring helmets.



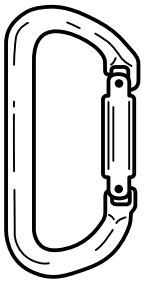
The helmet should be properly fitted and adjusted.

Carabiners

Carabiners are the essential connectors of climbing systems. Most carabiners are made of aluminum alloy or high-grade steel. A spring-loaded gate allows a carabiner to be snapped around an item. Carabiners are either *locking* or *nonlocking.* They are further distinguished by their shape—oval-shaped, D-shaped, or pear-shaped.

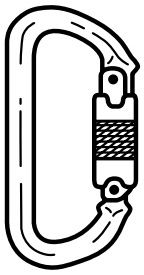


NONLOCKING OVAL



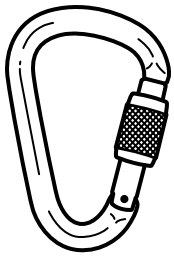
NONLOCKING D-SHAPED

The original carabiner was an oval shape. Under tension, the rope rides to the center of the oval, putting half of the load on each side of the carabiner. The gate side then becomes the limiting factor on the strength of the carabiner. The D-shaped carabiner came out next. It was designed to have the rope under tension ride to the spine side of the carabiner. This increased the carabiner's strength rating. The last notable design was the pear-shaped, or the offset D, carabiner. One end is larger than the other, making it easier for more items to be clipped into the carabiner.



LOCKING D-SHAPED

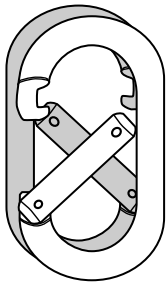
Locking carabiners have mechanisms for guarding the gate when it is closed. The lock can vary from a simple threaded collar that screws down over the gate to a spring-loaded, automatic-locking device that secures the gate in such a way that there is less chance of it accidentally opening.



LOCKING PEAR-SHAPED

Use locking carabiners for joining belayers to anchors and belay devices, and rappellers to rappel devices. A double-locking carabiner requires two actions to unlock its gate. Conduct a visual and physical check to be sure that the carabiner gates are locked before beginning any belaying activity. Any carabiner attached to a steel cable must be made of steel.

Nonlocking Carabiners



Unlike a correctly closed locking carabiner, the gate of a nonlocking carabiner may accidentally open if it pushes against a rock, a rope, or even a climber's clothing. The dynamics of a hard fall arrested by a rope running through a carabiner can cause *gate lash*—the momentary opening of a carabiner's gate due to the gate's inertia overcoming the spring tension, collision of the carabiner against another object, or the vibration of the rope over the carabiner.

If a load comes onto a carabiner at the instant the gate is open, carabiner failure may occur. (A carabiner with its gate open typically has less than 50 percent of its rated, gate-closed strength.) Using carabiners with locking gates or using pairs of carabiners will significantly reduce this type of carabiner failure. When two nonlocking carabiners are used together, the gates should be reversed so that when they are pressed open the gates form an X. That orientation will prevent both carabiners from being accidentally opened at the same time.

Bent-Gate Carabiners

Bent-gate carabiners have a concave gate that makes them easy to clip onto ropes and slings. They are used primarily for lead climbing and sport climbing, and are not commonly used for BSA climbing or rappelling activities.

> **Beware of Look-alikes**
>
> Be aware that some carabiner-like items are designed for uses other than climbing—such as key rings or accessory holders. Allow no carabiners or carabiner-like items on a program site except those of known history, strength, and appropriateness for use by climbers, rappellers, and belayers.

Dangerous Carabiner Loading Conditions

The breaking strength of carabiners must be 5,000 pounds, making them strong enough to handle any loads normally found in climbing, rappelling, and belaying situations. Incorrect use of a carabiner, however, can result in failure at loads well below its rated strength. Among those incorrect uses are the following.

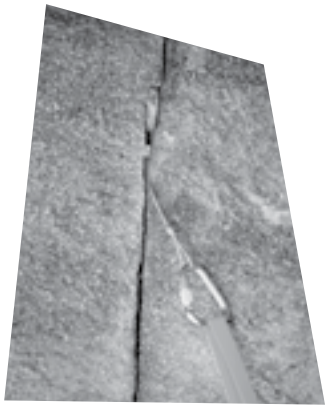
- The weakest part of a carabiner is its gate. Cross-loading a carabiner (pulling it sideways rather than end-to-end) will decrease its strength by more than half.
- A carabiner with its gate open loses more than half its strength. Avoid situations where the gate could accidentally open.
- Carabiners sustaining loads while on an edge such as the lip of a cliff or a nub of rock can break at very low load levels.
- Carabiners loaded from more than two directions cannot be considered fully reliable.
- Carabiners should always be loaded along the long axis.
- Never use carabiners that have been left at climbing sites because they may have been damaged.

Anchors

Belay systems and personal safety systems must be connected to an anchor. Every COPE or climbing event will have an anchor at the top of the route that supports the life safety system. There might also be an anchor at the bottom of the route where the belay device is connected. The belayer may also be connected to an anchor, but should avoid placing his or her harness into the belay system. In some cases, the belay team serves as the bottom anchor. Top anchors must be rated to 5,000 pounds or be backed up and considered bombproof. Examples of life safety anchors are:

- **Wire rope**—The most common wire rope used on challenge courses is ⅜-inch galvanized 7x19 wire rope. Cable terminations must be backed up. The carabiners, quick links, and pulley sheaves that attach to cable must be made of steel. Larger wire rope may be used in some applications.
- **Bolts**—Eye bolts may be through-bolted in trees or poles. Eyelets may be used with a machine bolt to fabricate an eye bolt. Anchor bolts used with a hanger may be placed in rock to create an anchor. The two most common types of anchors used in rock are expansion anchors and epoxy anchors.
- **Utility poles**—Anchors can be created by slinging around a pole. Class 1 and 2 poles are acceptable for critical anchor points. Lesser classification of poles may be acceptable if engineered for that application.

- **Trees and rocks**—When used as climbing anchors, trees must be 6 inches in diameter at the point of attachment. Trees should be living and well rooted. Cordage or cable may be slung around trees or a rock to create an anchor. Trees may also be through-bolted. A boulder or rock outcropping should be large enough to be considered immovable.
- **Active and passive protection**—Hexcentrics, stoppers, spring-loaded camming devices, big bros, and tri cams may be placed in the rock to create an anchor. Multiple placements are joined with cordage to spread out the load over all of the placements and to provide redundancy.



- **Structures**—Beams, columns, joists, and other parts of a structure may serve as anchor points. Parts of a structure that will serve as anchors must be evaluated by an engineer to confirm that they are adequate to resist the loads imposed by life safety systems. Tubular devices and pipes used as belay beams must be evaluated as well.

Multiple anchor points are brought together by cordage to create a single attachment point that spreads the load across the anchor points, such as a cordelette. The attachment loop at the bottom of the cordelette is called the master point. Cordage that is used to connect multiple anchor points should be considered part of the anchor and must meet loading requirements of the anchor. Pulleys and shear-reduction devices that clip to the master point are considered part of the anchor system as well.

Pulleys and shear-reduction blocks are used to limit the shear force on the rope. Shear force is the tendency for the rope to sever where it is bent around an object. If a rope were to pass through just a single carabiner at a master point, the strength of the rope is reduced by 50 percent. A minimum bending diameter of two carabiners should be used for shear reduction at the top point of a slingshot belay line. The larger the diameter of the sheave, the less shear force is applied. It is wise to use pulleys with built-in backup on COPE and climbing facilities, particularly in applications where they are difficult to inspect on a daily basis.

COMMON PARTS OF PERSONAL SAFETY SYSTEMS

Cable Ascender

A belay cable may be run vertically up a pole or element to provide access to an event. Instructors will connect to the cable with a cable ascender. The ascender will travel up the cable as the instructor climbs to the event. The cable ascender should be manually pushed up the cable as the instructor climbs. This must be done by lifting the tether or carabiner. Never hold the body of the ascender. Keeping the ascender at chest level will limit the dropping distance in the event of a fall.

Zip-Line Tether

The tether that connects the participant on a zip line to the zip wire is considered a personal safety system. A pulley designed for zip-line operation is connected to the zip wire. Typically the participant is connected to the pulley with a short length of a tether. Tethers can be made of rope, multiline, or webbing. Many zip systems will also have a redundant tether.

Lanyards

Lanyards may be homemade or manufactured. Homemade lanyards can be made of rope, webbing, or cable. They need to be made to have a rating of 3,375 pounds. Lanyards made of multiline commonly used in ropes courses are called lobster claws. They are made with Prusik knots so that the length of each leg is adjustable. Lanyards from the construction industry are also acceptable for BSA programs. Lanyards normally have steel connectors on the ends of the legs; these may be a simple carabiner or may be a self-locking connector. The connection to the participant may be with aluminum or steel connectors. Some types of lanyards have a loop in the material of the lanyard that girth hitches directly to the harness.

Lanyards used for traversing must have two lengths coming from the central connection point. One of the two legs must be connected at all times. Participants traversing with personal safety systems can use a ground spotter to provide a means of double-checking their safety connections. As the participant makes a connection to a new anchor, he calls "hook" to his ground spotter. The spotter confirms the action and replies with "hook." The participant then locks the carabiner and calls "lock" to the spotter. The spotter, having watched the lock happen, will reply with "lock." The participant will then squeeze test the carabiner to double-check the lock. After confirming the lock, he will call "check" to the spotter who will call back "check" to confirm the action. The sequence will then be repeated as the second leg of the lanyard is moved to the new anchor.

A staff member or participant who is stationed on a platform and will not be traversing might have a lanyard with a single connection in lieu of a double-ended lanyard.

Continuous Belay

Some more modern belay systems involve special hardware that allows for participants to traverse between elements and around corners without breaking belay. Special shuttle systems are made to be able to pass around the cable connection hardware. The shuttles will use the same types of tethers as a zip-line system to connect the participant to the shuttle.

Self-Belayed Climbing

The most common example of self-belayed climbing at Scout camp is ascending the staples on a pole with lobster claws or other lanyards. This is problematic because the climber can climb above the anchor, exposing himself or herself to a potentially significant fall. Keep in mind that research indicates that staples do not consistently meet the required 2,500-pound pull-out strength required for self-belays. It would be wise to use only steps that are specifically designed for self-belayed climbing for this type of access.

Anyone practicing self-belayed climbing must wear a load-limiting device due to the potential impact that might be created by a fall. Setting up a belay rope or cable ascender are preferred methods over lanyards for ascending a pole. Load-limiting devices must also be used when the connection from the participant to the anchor does not have any energy absorption built into the system (e.g., connecting to an eye bolt with a lanyard). Connections to belay cables will typically not need a load-limiting device.

COMMON PARTS OF BELAY SYSTEMS

Friction Devices

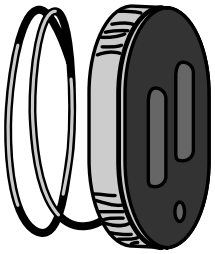
A belayer on the end of a climber's rope will need a friction device in order to catch the loads that would be generated in a fall. Friction devices in a lowering system help to make the load manageable.

Friction is generated by the ropes twisting, wrapping, and being pinched through different devices. Common types of friction devices are slotted plates (Sticht plates), tubular devices, figure eight plates, self-locking devices, just-right descenders, and brake bar racks. Most devices provide a predetermined amount of friction, but a few are adjustable and can be set in different ways to provide different amounts of friction. Many devices are designed to be used only with certain sizes of rope. Make sure the friction device is compatible with the size of rope you are using.

Participants must be attached to friction devices with a locking carabiner. Each friction device generates a different amount of effective braking force by the bend of the rope through the device and around the carabiner. The more effective the braking force, the more and tighter bends the rope is making,

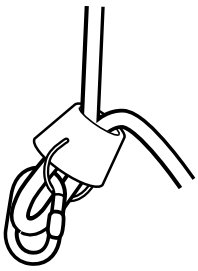
and, therefore, the more damage you are doing to your rope. This is a necessary evil as braking force is needed to arrest a fall.

Slotted Plate



A slotted plate is also called a *Sticht plate*. It is available with or without a spring. The spring version may be easier to use. A bight of rope is fed into the slot in the plate and clipped into the carabiner. Each rope should go in and out of the same slot.

Tubular Device



Tubular devices are similar in operation to a slotted plate without the spring, although tubular devices feature a greater surface area to dissipate heat.

Figure Eight Descenders

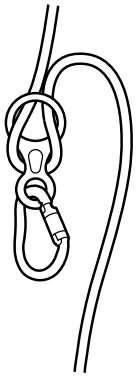


Figure eight descenders are commonly used for rappelling but also can be used for belaying when used according to manufacturer's guidelines. They can be set up in different ways for different levels of friction. The standard setup is to pass a bight of rope into the large hole and around the small hole. Double-wrap a figure eight descender to create extra friction, such as when rappelling with a backpack. Figure eight descenders can be locked off while rappelling so the rappeller can go hands free.

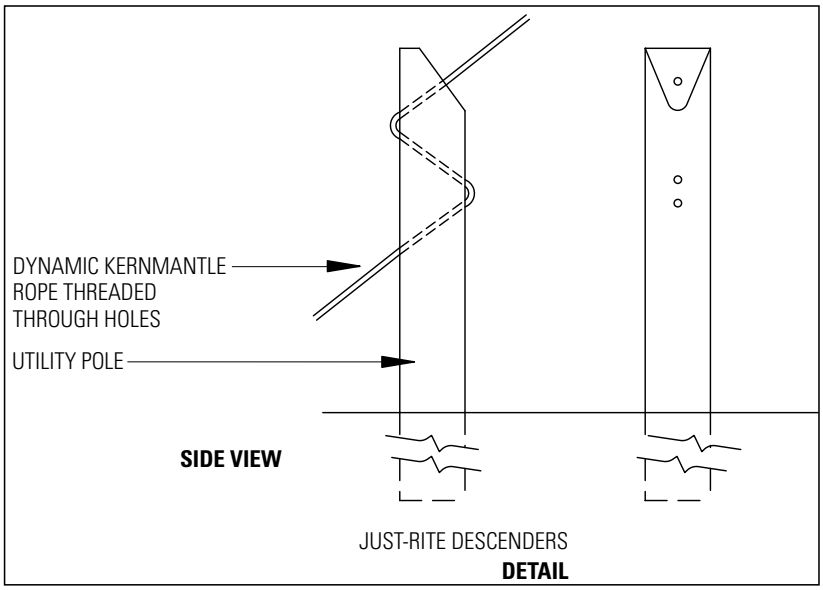
Figure eight descenders are also available in a larger variety made for rescue. These figure eight descenders have ears that prevent accidentally girth hitching the rope to the big hole when trying to lock off. They also have an enlarged (or second) small hole for attachment of additional carabiners. A figure eight descender doesn't have as much braking force as a tubular device because the rope doesn't make the sharp bend around the carabiner. Instead, the rope makes a more gradual bend around the neck of the figure eight descender. Similarly, they are easier on the rope as they don't make as sharp of a bend as tubular devices. Figure eight descenders do put a significant twist into the rope.

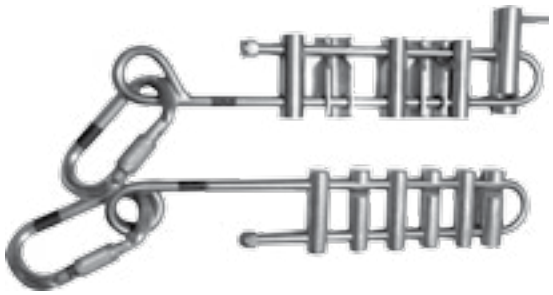
Specialized Belay Devices

Some specialized belay devices are appropriate for BSA activities, such as the Trango Cinch, the Edelrid Eddy, the SMC Spider, and the Petzl Grigri. These self-locking belay devices are often used at indoor climbing gyms. Using the same principle employed by automobile seat belts, a camming device inside the self-locking belay device locks up whenever the rope is loaded with sufficient tension. As a result, these devices are seen by many to be a belay device that requires minimal input from a belayer.

Just-Right Descender

A just-right descender is a section of utility pole or 8"x8" wood beam that has three holes drilled through the pole in a Z shape. These friction devices are commonly used on the confidence pole as they are able to absorb a substantial force since they are buried in the ground. These are not to be used on traversing elements since they cannot travel with the participant, but they are common for vertical elements.





Brake Bar Rack

The brake bar rack is a very sophisticated friction device. This device is easy on the rope because it does not make any sharp bends or put any twist into the rope. The brake bar rack is an adjustable device, even while being used. Brake bar racks are common in rescue and caving due to the extremely controlled descent that they allow. Brake bar racks can also be locked off.

Most brake bar racks have five or six bars. A minimum of three bars should be engaged at all times. A great deal of caution must be used when rigging the brake bar rack. If the rack is set up backward, the bars will all snap off instantly. Many brake bar racks have a training groove in the first bar to help prevent it from being set up backward.

Münter Hitch

A münter hitch is a knot that can be used as a friction device in an emergency situation.

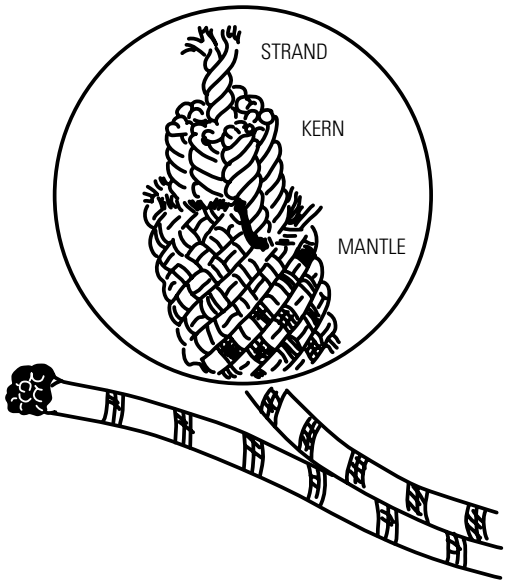
> Self-belaying rappelling with only friction knots (i.e., Prusik or similar knots), body rappels, and brake bars on carabiners are not appropriate means of generating friction for BSA activities.

Rope

Rope is the lifeline of climbing and rappelling. It is vital for stopping the falls that inevitably occur as participants learn and practice climbing and rappelling. The quality of a rope and the way in which it is handled can mean the difference between life and death. Take care of your rope. Keep it clean and away from harsh chemicals, don't step on it, and avoid prolonged exposure to sunlight. Soiled rope can be washed with mild soap and allowed to air dry.

In the 1800s, when people began recreational climbing in earnest, it was a commonly held hope that a climber simply would not fall. The thinking stemmed in part from the reality that the ropes of the time were likely to break when suddenly put under strain. Those ropes were constructed of natural fibers such as manila or sisal that were twisted, or *laid,* into lengths. They were prone to rot if allowed to remain wet for long periods. Natural fibers make ropes that are *static,* meaning they have little ability to stretch; they must absorb the impact of a falling body all at once, rather than gradually.

By the 1950s, modern materials had made possible the development of rope described as *dynamic,* meaning it has a significant amount of stretch. Because of its elastic properties, a dynamic rope will stop a falling climber gradually rather than all at once by absorbing much of the energy generated by the fall. That reduces the shock load on the rope, on the anchors, and on the climber. Dynamic rope revolutionized the sport of climbing by making it possible for climbers to survive uninjured the sorts of falls that a century before could have been serious and even fatal.



Today, ropes that stretch little—static ropes—may be used for top-roped climbing or rappelling. Static ropes may also be used in situations requiring the use of ascenders or hauling, such as in caving and rescue work. Dynamic and static ropes approved for BSA climbing and rappelling are *kernmantle* ropes. Each is composed of a woven sheath (the *mantle*) over a braided core (the *kern*). The core bears the brunt of the load placed on the rope, while the sheath protects the core from damage. A 50-meter (165-foot) kernmantle rope with a diameter of 11 millimeters (7/16-inch) weighs from 6 to 9 pounds. Its core is woven from 50,000 filaments and the sheath from 30,000, with each filament running the full length of the rope.

The rope connects to all of the other pieces of the life safety system. Ropes are available in many different sizes. Life safety ropes commonly range from 8 to 11mm. Kernmantle rope is the most common. There are also ropes made with braided construction that are common in tree climbing. Three-strand or laid rope is not to be used as a life safety rope. Ropes are most commonly made of nylon, but some are made of polyester, which provides less stretch and reduction of strength when wet. All ropes used for BSA activities should be designed for climbing and certified by the UIAA, CEN, or NFPA.

Ropes are available in different types of stretch. At the manufacturer's facility, rope is loaded with a weight equal to 10 percent of its breaking strength. The rope stretch is then measured. If the stretch is more than 10 percent, it is classified as a dynamic rope. If the stretch is between 6 and 10 percent, it is classified as a low-stretch rope. If the stretch is less than 6 percent, it is classified as a static rope. Dynamic ropes can be used for belaying and rappelling. However, dynamic ropes are not commonly used as rappel lines. Static and low-stretch ropes may be used for belaying and rappelling. Because BSA climbing is all top-roped, the fall factor is insignificant, and therefore static ropes are acceptable for top-roped activities.

Here is a formula to determine fall factor:

Fall factor = fall distance/rope length

Fall factor cannot be greater than 2.

If fall factor is between 0 and 0.25, any rope can be used for belaying.

If fall factor is greater than 0.25, a dynamic rope should be used for belay.

Purchasing New Rope

Rope for BSA climbing and rappelling activities must have a clearly documented history. Rope entering a climbing program must be new, have UIAA, NFPA, or CEN approval, and be procured from a reliable vendor. In most cases, this means buying rope of the standard length and diameter or purchasing spools of rope of up to 1,000 feet in length and cutting the rope into appropriate lengths. Buying by the spool may afford some economy, but it also means a climbing area will have a great deal of rope aging at the same rate. Unless BSA instructors are certain the rope will be used in such large volume, it may be wiser to purchase rope in precut lengths as the need arises.

Numbers printed on a band at each end of a new rope provide information about its intended uses. The number "1" in a circle indicates that the rope is rated for use as a single line—that is, as a belay rope for climbing or rappelling, or as a single line for rappelling. The fraction "1/2" in a circle means a rope is rated for use with another 1/2" rope.

When shopping for rope, there may be the option of buying either *standard* rope or *dry* rope. The mantle of dry rope is impregnated with a chemical treatment that makes the rope water resistant. Dry rope may cost more than standard rope, but for climbing areas where frequent rain or afternoon thunderstorms are a factor, not having to dry out soaked ropes can more than make up for the added expense. This treatment is useful for ice climbers and cavers but provides little advantage for a summer camp program.

The safety factor accounts for many variables, including shear force, abrasion, rope age, safety, knots, and angles in the rigging.

Here is a formula to determine rope breaking strength:

Minimum breaking strength = working load x safety factor

ACCT 5,000 = 1,000 pounds x 5 safety factor

NFPA one-person 4,500 = 300 pounds x 15 safety factor

NFPA two-person 9,000 = 600 pounds x 15 safety factor

Webbing

Webbing has characteristics similar to rope. Webbing must be designed for climbing and is available in flat and tubular construction. Webbing must be 1 inch wide if used for Swiss seats. Anchor systems made from webbing must rate to 5,000 pounds.

Treat webbing with the same care as rope. Keep it clean and away from harsh chemicals, don't step on it, and avoid prolonged exposure to sunlight. Soiled webbing can be washed with mild soap and allowed to air dry.

Lengths of nylon webbing have many uses in climbing and rappelling activities. All webbing used for BSA climbing and rappelling must be designed for that purpose and have a minimum breaking strength of 17.7 kilonewtons (4,000 pounds) when new. Tubular webbing is strong and light. When the ends are commercially sewn together or tied with a water knot, a piece of the webbing can be made into a loop known as a *runner, utility loop,* or *sling.* Climbers use runners for rigging anchors, for forming chest harnesses, as tethers for managing rope, and in some rescue situations.

Ready-made Runners

Runners of various lengths and widths can be purchased from reliable climbing stores and outfitters. The stitched portion of a runner has as much or more strength than any other portion of the webbing. Presewn runners with a carabiner secured in each end are called *quick draws* or *express slings.* Although used primarily by lead climbers, they may have applications in anchoring systems for BSA climbing and rappelling activities.

Individuals should not attempt to sew webbing. Stitching webbing requires equipment and expertise beyond that available to nonprofessionals.

One-inch tubular webbing must be used to make tied-seat harnesses. It can also be used in constructing an anchor system or to attach belayers to anchors.

There are several ways to cut webbing, including these methods:

- Heat a butter knife over a flame using a gloved hand. The hot knife will easily cut through nylon webbing and will seal the ends, preventing the webbing from unraveling.
- Use sharp scissors or a sharp knife. Guard the freshly cut ends against unraveling by briefly holding each over a flame to melt and fuse the fibers.

Nylon webbing can be harmed by friction, dirt, exposure to chemicals, and harsh weather. It is also susceptible to damage from ultraviolet light due to extended exposure to sunlight. Retire any webbing that shows signs of abrasion, undue wear, fading, or other indications of deterioration. Regardless of its appearance, every piece of webbing must be retired according to BSA standards.

Accessory Cord

High-strength accessory cord, 7 to 9 millimeters in diameter, may be helpful as a self-locking Prusik knot to provide a backup system for newly trained rappellers. A 20- to 25-foot length of 7-millimeter accessory cord can be used to tie a cordelette to equalize the load among anchor points. A short piece may also be helpful for rescues in which one or both hands may be needed to assist a student or accident victim. At no time should accessory cord be used as a substitute for climbing rope. Most accessory cord is static in that it has minimal stretch. Accessory cord requires the same care as rope.

KNOTS

Types of knots used in climbing include loops, hitches, ending knots, joining knots, and friction knots. When deciding what type of knot to use, consider the knot's strength, security, and ease of tying and untying.

Common climbing knots include the following:

Loop Knots	**Friction Knots**
Double figure eight	Bachman
Figure eight on a bight	Klemheist
Figure nine	Autoblock
Bowline	Prusik knot
Figure eight follow-through	
Bowline on a bight	
Alpine Butterfly (butterfly)	
Directional figure eight (inline figure eight)	

Joining	**Hitches**	**Ending**
Water knot	Clove hitch	Overhand
Flemish bend	Girth hitch	Barrel
Double fisherman's	Münter hitch	Mule knot
Mariner's knot		
Overhand bend		

Knowing a variety of knots and their proper uses is of paramount importance for anyone interested in climbing and rappelling. BSA instructors must be able to tie knots with ease and know which ones to use when setting up safe systems for climbing, rappelling, and belaying. In an emergency, the ability to tie the correct knots quickly and with certainty can spell the difference between an effective rescue and one that is fraught with difficulty.

Becoming an expert with knots is a matter of repetition. The more they are tied, the more deeply ingrained they will become to your fingers. Instruction is helpful, either from printed resources or from a good teacher, but mastery comes only with practice. A rope is strongest when it is straight—free of knots, hardware, and bights. Adding any of these elements reduces a rope's strength, although some knots are stronger than others.

In addition to tying a knot correctly, climbers should also make it a habit to *dress* each knot—adjusting it so that the knot is neatly arranged and snug. This will align the strands of the knot in such a way that it will have the greatest possible strength. A good ritual to follow when tying knots is:

- Tie it.
- Dress it.
- Load it.
- Check it.
- Double-check it.

Parts of a Rope

The following terms are useful for describing how to tie knots.

- **Running end,** also known as the working end or simply the end. This is the free end of a rope, most often used for tying a knot, securing a rope to a climber or anchor, reeving (passing) a rope through a rescue pulley, or some other active use.
- **Standing part.** The portion of the rope that is not the running end is the standing part.
- **Bight or bend.** A bight in a rope (also known as a bend) is a simple turn that does not cross itself.
- **Loop.** A loop in a rope is a simple turn that does cross itself.
- **Tail.** The end of the rope left over after a knot has been made is the tail. Climbers often use the tail for tying a safety knot.

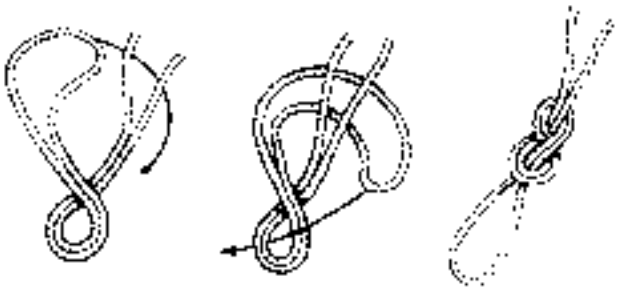
Safety Knots

A safety knot (also known as a backup or *stopper knot*) added to the primary knot such as a loop knot will help prevent the free end of the rope from working itself loose. The most effective safety knot goes by several names—*barrel knot, one-sided grapevine knot*, and *half a double fisherman's knot*. Form it by loosely looping the tail of the rope twice around the standing part, then passing the end through the two loops thus formed. (This is the same method as is used to tie the first portion of the double fisherman's knot, described later in this chapter.)

Work any slack out of the safety knot so that it lies snug against the knot it is protecting. Safety knots can also be used to protect knots tied in webbing. The overhand or half hitch is used as a safety knot in webbing.

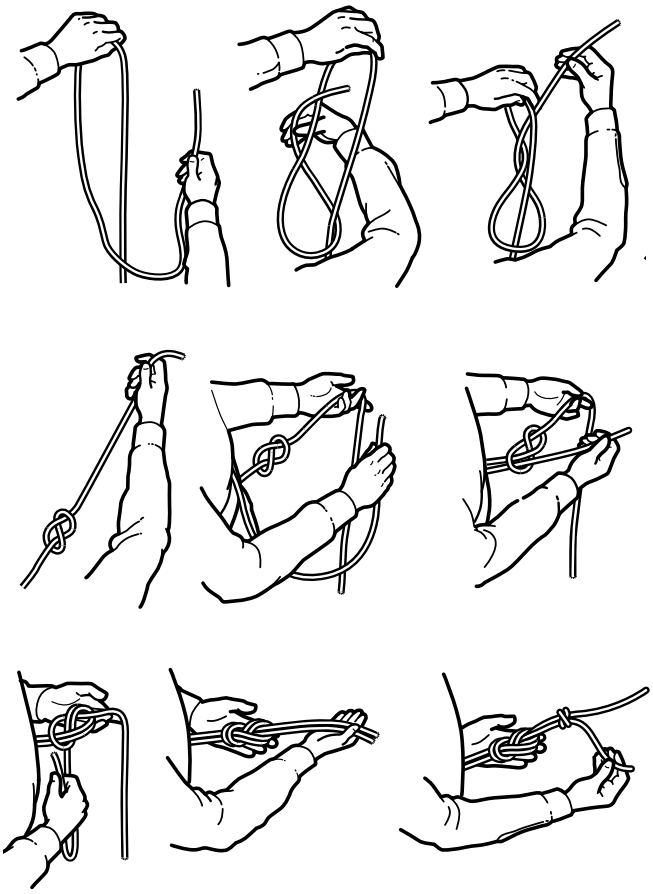
Knots for Anchoring, Climbing, Rappelling, and Belaying

Figure Eight on a Bight



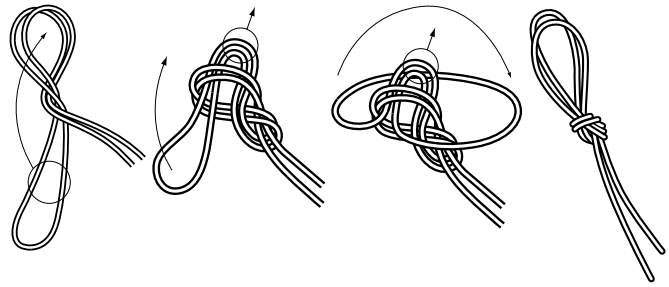
Making a bight in a rope and then tying a figure eight knot with it results in a loop that will not slip or come loose. Clip a carabiner into the loop, and the rope can be attached to an anchor sling.

Figure Eight Follow-Through



The figure eight follow-through is similar to the figure eight on a bight, differing only in the way in which it is tied. The figure eight on a bight must be tied in a rope *before* it is attached to a carabiner, while the figure eight follow-through is tied directly to a harness. The end of the rope can be passed through an anchor sling or a harness before the knot is tied.

Double-Loop Figure Eight



The double-loop figure eight is also known as the super eight. It is useful in climbing situations because the two loops can be used in anchoring and it is easy to untie after being loaded. Because there are two loops in the knot there is less shear force on the rotpe.

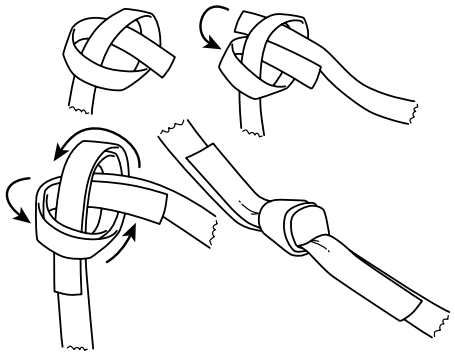
Directional Figure Eight

This knot is very similar to the figure eight on a bight with the only difference being that the tails to the knot come out of opposite ends. This knot can be effective when tying into anchors that are in line behind each other.

Figure Nine

The figure nine is similar to the figure eight on a bight with an additional twist. The added twist makes the knot asymmetrical and prevents it from cinching down too tight. For this reason the knot is relatively easy to untie after being severely loaded. The figure nine is commonly used as the attachment knot for the Flying Squirrel.

Water Knot (Ring Bend)



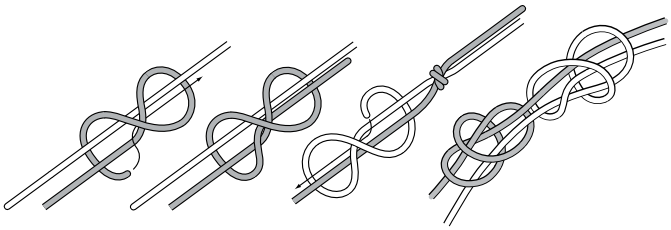
Use a water knot to tie together the ends of webbing to make a loop sling for use as a runner in an anchor system or when tying a harness. Once it has been tightened, the water knot seldom slips and can be difficult to untie.

Also known as an *overhand bend* or a *sling knot,* the water knot should be used only with webbing. To form loops in rope, use the *double fisherman's knot.*

Flemish Bend (Figure Eight Bend)

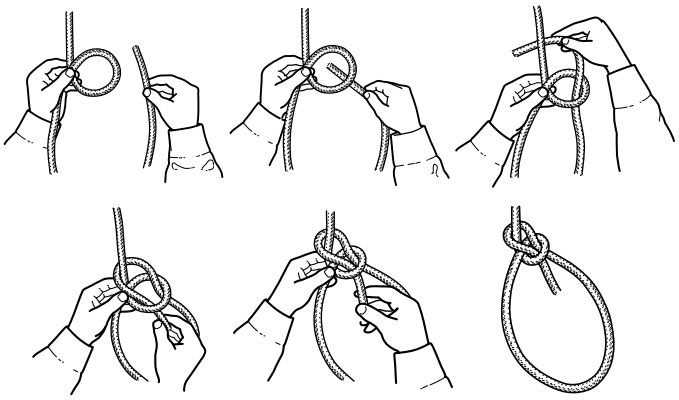
The Flemish bend is used to join two ropes of the same size. First tie a figure eight in the end of one rope. Retrace the figure eight knot with the second rope. The tails of the knot should come out opposite ends of the knot.

Double Fisherman's Knot (Grapevine Knot)



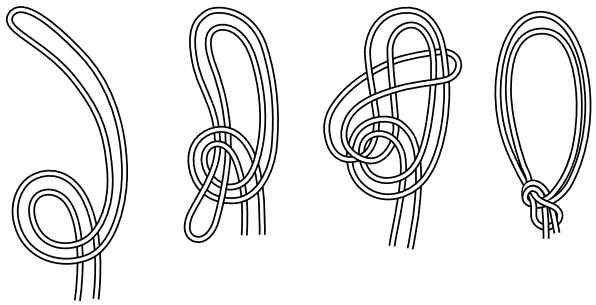
This knot is used for joining two ropes of either similar or dissimilar materials. It is also used to tie together the ends of a shorter piece of rope or accessory cord to form a runner or loop. Half of a double fisherman's knot (also known as a barrel knot) can be used as a safety knot to back up a primary knot such as a figure eight on a bight.

Bowline



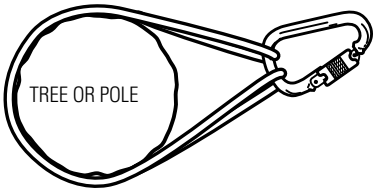
The bowline allows a climber to make a reliable loop around a tree or other anchor. The loop will not slip or cinch down and is easy to untie. Always tie off the tail.

Bowline on a Bight



The bowline on a bight is a variation of a bowline. It is a high-strength knot. The completed bowline on a bight will have two loops.

Basket Hitch

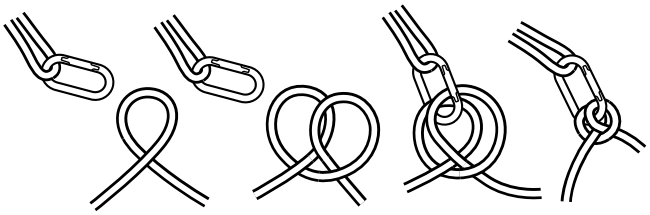


The girth hitch is not recommended for anchor systems because it greatly reduces the strength of the rope or webbing. A better method is to use a *basket hitch:* loop a tied piece of webbing around an anchor point and secure both end loops with a locking carabiner.

Butterfly

The butterfly knot is a loop knot that can be tied in the center of a rope. The loop can be used for attachment and also for isolating a bad section of the rope.

Clove Hitch



A clove hitch can be used in anchoring and belay systems to secure a rope to a carabiner. Its advantages are that it is easy to install and to adjust. However, the system should also include at least one additional knot that will not adjust, such as a figure eight follow-through, to provide the fail-safe security not available with a clove hitch alone.

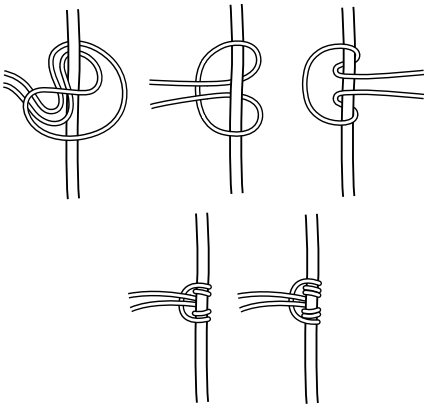
Autoblock Knot

The autoblock is extremely similar to the Klemheist except the final bight of the sling is clipped into the carabiner instead of being passed through the other end of the sling. The autoblock is commonly used as a backup or "third hand" when rappelling. The autoblock is often attached to the leg loop of the harness on the rappel side. It can also be attached to the belay loop when the friction device is extended from the harness.

Overhand Knot

This simple knot can be used as a safety knot to finish off the tail of a loop knot. The overhand knot is not particularly secure as a backup knot.

Prusik Knot



The Prusik knot secures a loop of smaller rope or accessory cord to a climbing rope in such a way that it can be slid along the rope, but when it is loaded will bend the rope and hold securely. The knot is commonly tied with accessory cord by a climber to ascend a rope or to secure a belay system in order to release the belayer. The cord used with a Prusik knot should be 4 millimeters smaller or 60 to 65 percent smaller than the rope to which it is secured.

To use the Prusik knot to ascend a climbing rope anchored at the top of a route, clip a carabiner to the free bend of the Prusik and attach it to a runner that will serve as a stirrup. Clip the climber's harness to a second Prusik. A climber can stand in the stirrup and push the harness Prusik up the rope, then put weight on the harness and slide the stirrup Prusik higher. Repeating the process will carry the climber up the rope.

Bachman and Klemheist Knots

These friction knots are basically the same as the Prusik knot in function. The Bachman uses a carabiner integral with the knot. The carabiner serves as a handle when advancing the knot along the host rope. Both the Bachman and the Klemheist can be tied with either cord or webbing.

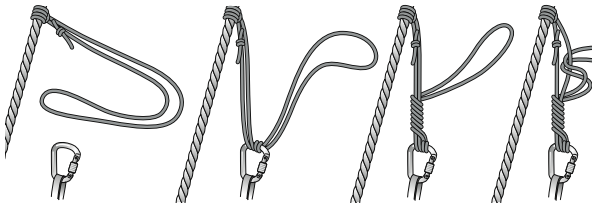
Barrel Knot

The barrel knot is the most common safety knot used in BSA programs. The barrel knot is just one side of the double fisherman's knot.

Mule Knot

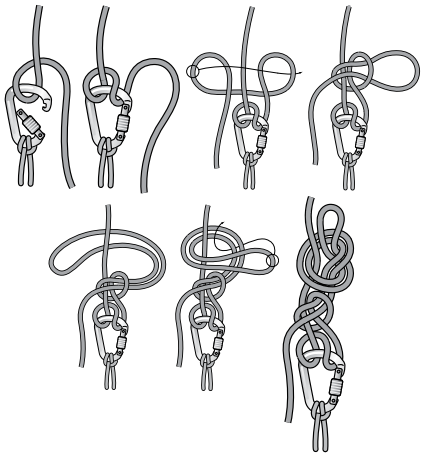
The mule knot is used for locking off a Münter hitch, slotted plate, or tubular device. The mule knot is tied by passing a bight of rope through the carabiner, then tying a slippery overhand knot around the belay line. The bight is then tied in an overhand knot around the belay line as a safety. The mule knot should be tied as close to the friction device as possible due to potential slipping.

Mariner's Knot



The mariner's knot is a hitch made by wrapping cordage between two carabiners. The mariner's knot can be released while under load. This is useful when transferring a load between two different anchors, such as passing a knot or during a belay escape.

Münter Hitch (Italian Hitch) With Mule Knot



The Münter hitch is the knot to rely upon for emergency belaying when a belay device is not available. Used with a locking carabiner (a large, steel, pear-shaped carabiner works best), the hitch allows the rope to be fed through the carabiner or pulled back. The Münter hitch can also be used by a rappeller to control the rate of descent. However, it tends to twist the rope. For these reasons, a rappel device, if available, is the better choice.

Competent belayers to manage the ropes that protect climbers and to be always ready to arrest a fall are vital to the safe operation of a BSA climbing program. In fact, belaying may be the most important skill in climbing. A belayer can safeguard inexperienced climbers and rappellers, and can make it possible for skilled climbers to attempt routes that would otherwise be too dangerous. There is no way to compensate for a belayer who does not have sound skills and good judgment. Climbing and rappelling activities cannot begin until the instructor is confident that all belayers are well trained and highly responsible.

The techniques of belaying have evolved dramatically through the decades. The earliest belayers simply grabbed a rope with their hands, braced themselves as best they could, and hoped that the climber tied to the other end would not fall. Over time, belayers learned the importance of tying themselves to an immovable object so that they would not be pulled down the mountain during the tumble of a climber they had been entrusted to protect. They also discovered ways to wrap the rope around their bodies and manage it to give anyone tied to the other end the best chance of surviving a fall.

More recently, the development of friction devices has revolutionized belaying by providing belayers with simple, reliable means of maintaining maximum control over the rope with minimum effort.

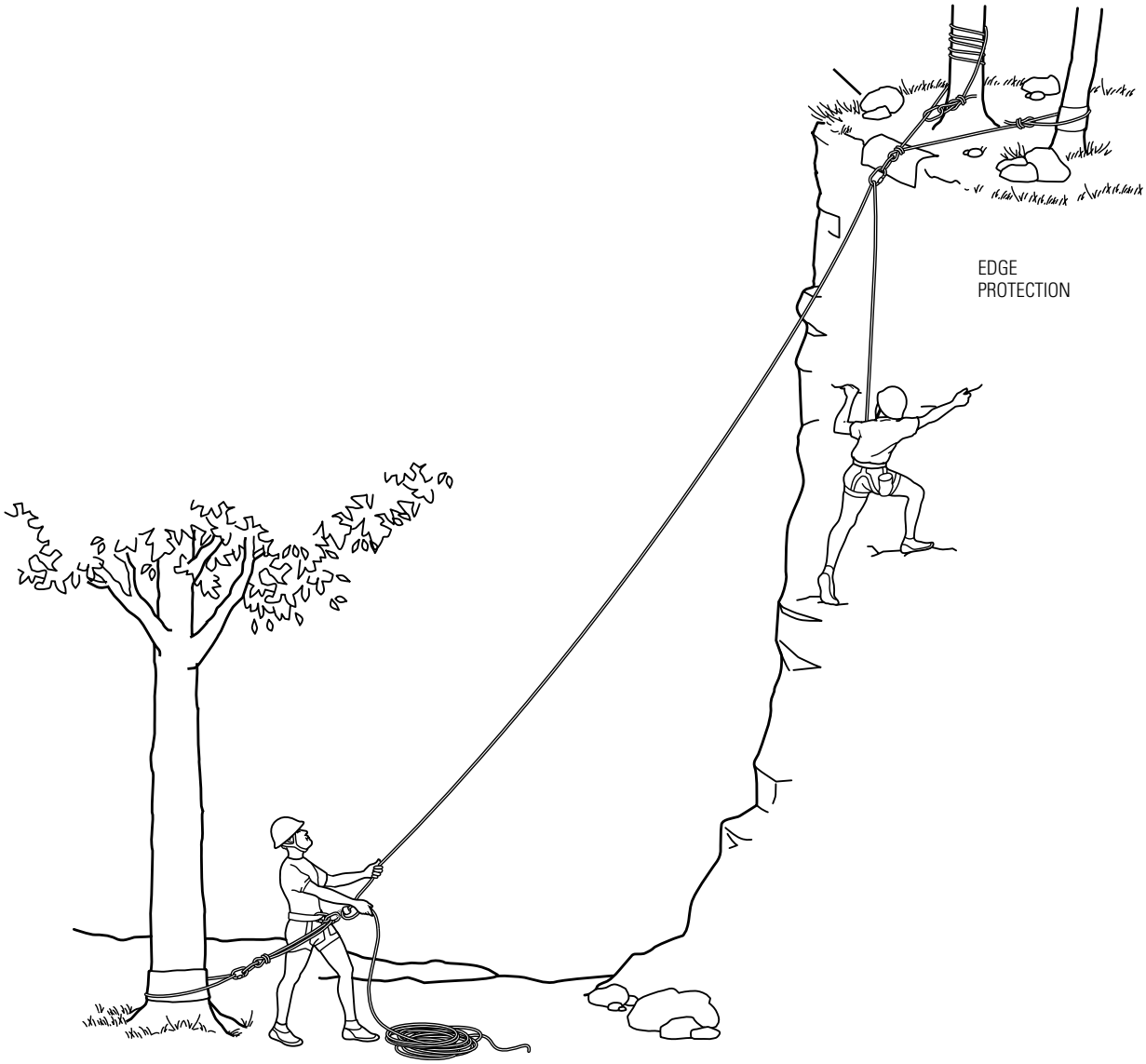
> Anyone who is *bouldering*—practicing climbing moves closer to the ground or beginning a climb—does not need to be tied into a belay rope, but should be protected by *spotters* positioned to lessen the impact of a short fall.

Belaying in the BSA

The most common belay technique is the slingshot belay. This involves attaching one end of the rope to the participant and passing it through a shear-reduction device that is attached to the anchor at the top of the event. The rope then goes to the belayer, who may be at the top of the route but is typically at the bottom. The rope is passed through a friction device that is attached to the ground anchor. The belayer is attached to the anchor near the belay

Bottom belay system setup

Belayer properly anchored for a bottom belay



Anchoring system

device that he or she is managing. A backup belayer is a few feet behind the belayer. Many councils also have rope tenders down the line from the backup belayer who will manage the extra rope.

The ideal belaying setup is to belay off of the anchor and to have the belayer attached to the system. Belaying without an anchor may place both the belayer and the climber or rappeller at risk. If the climber or rappeller falls, an unanchored belayer may be pulled out of position, even over a cliff, and both the belayer and the climber or rappeller could be injured. A belayer should be tied in in such a way that there is no slack. In addition, belayers can create greater stability by bracing their feet against the ground or a rock outcropping. Belayers must at all times remain alert with their attention focused on the climbers or rappellers they are protecting.

Belaying From Above

To belay from above, attach the belayer to the belay anchor with a locking carabiner (a double-locking carabiner is preferred) clipped to the front of the seat harness. The belayer should move forward to remove any slack between the harness and the anchor points. That will help prevent the belayer from being yanked off balance if the climber or rappeller falls. If necessary, adjust the length of the anchor sling to improve the belay position.

Belaying from above

The belayer should be located directly between the belay anchor system and the fall line. When the belay rope is sharply angled to one side of the fall line, a climber or rappeller who slips may pendulum across the face, increasing both the chances of injury and the strain on the belay system. Such a fall could also pull the belayer out of position if the loading force on the rope comes from a direction for which the belayer is not prepared.

Belaying From Below

While the techniques of belaying from the bottom of a route are the same as those used by belayers at the top of a climb or rappel, the methods by which a belayer is anchored may differ. A belayer on the ground who is belaying a climber may need to be tied into a single anchor point—one sturdy tree, for example, or a single rock outcropping—as opposed to the multiple anchor points of a belayer at the top of a climb. Belayers at the bottom of a route are usually situated so that even if they are pulled out of position, they cannot be dragged over a cliff or otherwise seriously endangered.A belayer on the ground should be secured to an anchoring system in the same manner as for belaying from above. The belayer must be outside the fall zone. A locking carabiner connects the front of the seat harness to the anchor sling. While sitting or standing, the belayer moves forward and/or adjusts the length of the anchor system to remove any slack between the belayer and the anchor point.

Sitting vs. Standing Belay

An effective belay can be accomplished from either a sitting or a standing position. A sitting belay is generally more stable because the belayer makes three points of contact with the ground. Bracing the feet against rocks can provide a solid belay stance. A sitting belayer is less apt to tire when belaying a number of climbing or rappelling participants; however, it is wise to change belayers long before the belayer tires physically or mentally.

A sitting belayer is easily observed by a nearby instructor. A standing belay from the top allows an experienced belayer to peer over the edge to observe the progress of the climber or rappeller. The anchor points should be fairly high so that the belayer stays in line with the direction of pull on the rope. A standing belayer can move effectively to take in or feed out rope as the progress of the climber or rappeller is observed. One foot should be placed forward of the other to provide the most stable stance. A standing belay from the bottom of the climb can be easy to manage. The belayer needs to stay close to the face of the climb. If the belayer backs up too far from the base, he or she is increasing the forces and may be yanked off his or her feet should the climber fall.

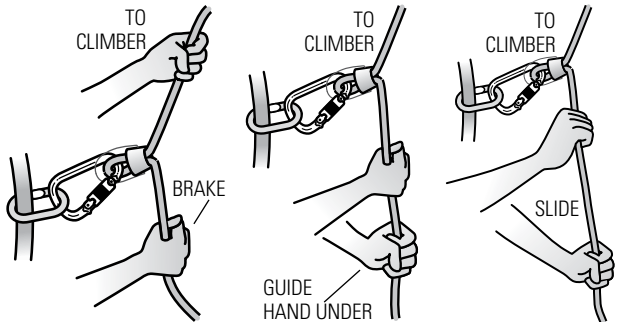
Belaying With Belay Devices

A belay device will bend the rope in such a way that the belayer can smoothly take in or feed out line. The belayer can also arrest a fall by bending the rope more sharply, creating friction and locking the rope in place. The devices are especially helpful if a small belayer is protecting larger rappellers or climbers. As with other climbing and rappelling skills, handling a belay device efficiently requires instruction and practice.

Use a locking carabiner to clip a bend of rope and the keeper loop of the device directly to an anchor system to

which the belayer is independently clipped. The keeper loop will prevent the device from migrating along the rope and beyond the belayer's reach. Arrange the rope so that the belayer's stronger hand (usually the right hand for people who are right-handed) will be the *brake hand*—the hand closest to the free end of the rope. The other hand will be the *guide hand,* resting on that part of the rope leading to the climber or rappeller. (Specialized belay devices such as the Grigri are set up a little differently. Refer to the manufacturer's guidelines.)

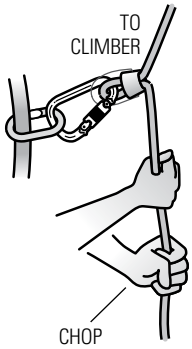
BUS Method (Brake Under Slide)



Start with the brake hand up by the friction device. The guide hand is extended toward the climber. The belayer grasps the rope with both hands and takes up slack. The brake hand will probably need to make a small arching move out of the locking position to get the rope moving. Then move the brake hand back to the locked position and down. Next, the guide hand lets go of the upper rope and grabs the brake side of the rope beneath the brake hand. After the guide hand has a firm grip, the brake hand slides back up next to the friction device. Finally, the guide hand returns to the pulling position and prepares to repeat the cycle.

Chop Method

In the chop method, both hands hold the rope on the brake side of the rope. When the belayer takes up slack, the rope is moved in an arched motion from the friction device to the brake position with both hands. Then one hand at a time is slid back up to the friction device. The arched motion loosens the friction device enough to allow the rope to slide through.



Backup Belayer

In the event the belayer becomes unable to fulfill his or her responsibility, a backup belayer can take over the belay responsibility. A backup belayer stands down rope from the friction device a few feet away from the belayer. He or she can apply tension on the friction device the same way as the belayer can to arrest a fall. The backup belayer should stand behind (not beside) the belayer where the rope is already in the locked-off position. Many backup belayers wrap the rope around them and hold both sections of rope out in front of them. The backup belayer should take in slack and give slack in coordination with the belayer. The backup belayer needs to be diligent not to keep the rope too tight as this will prohibit the belayer from doing his job. Also, the backup belayer must not have so much slack as to where he cannot be effective if needed. A properly tensioned rope between the belayer and the backup belayer will have a belly but will not lie on the ground. Many instructors say the rope will make a smile.

Verbal Signals for Climbers and Belayers

Safety at climbing and rappelling areas is impossible without good communication. Climbers, rappellers, and belayers have developed a standard set of signals to exchange information with one another. Participants should be introduced to these signals and should use them throughout BSA climbing and rappelling activities.

Hearing-Impaired Participants

Climbing instructors may have opportunities to work with participants who are hearing-impaired. Instructors should meet ahead of time with the adult leaders of those participants to develop appropriate strategies for ensuring safe communications during climbing and rappelling. A climbing instructor should be willing and able to work with hearing-impaired participants in a climbing or rappelling activity.

Limit talking in climbing areas to essential exchanges of information. Noise and the distractions of casual conversations can confuse belayers and those on belay. Participants waiting their turn should curtail visiting and avoid horseplay. If chattering becomes an issue, instructors should suspend climbing and rappelling activities until the situation has been remedied. If it is too windy or the area is too noisy for climbers and belayers to hear one another clearly, climbing and rappelling should be postponed or moved to another site.

Rock!

A shout of "Rock!" is perhaps the most important of climbing's signals. It warns everyone that there is immediate danger from something falling—a rock, a carabiner, an article of clothing, etc. Yells of "Rock! Rock! Rock!" warn of more danger than a single shout. Those hearing the warning should not look up but must immediately protect themselves in the most efficient way—taking refuge under a ledge, moving quickly to the left or right, or becoming "small" under one's climbing helmet.

The signals between a belayer and a climber or rappeller are clear commands and answers of just a word or two. Each command is always followed by a response of acknowledgment to ensure that the command was heard and correctly understood. Each word should be enunciated loudly and slowly, especially if the wind is blowing, distance is a factor, or a ledge or overhang prevents a belayer and a climber or rappeller from seeing one another. Several participants climbing or rappelling in close proximity should use names to be sure the right person is getting the message. When in doubt, repeat signals and responses.

Signals for Belaying Climbers

Generally accepted signals exchanged between a climber and a belayer include the following, listed in a normal sequence.

Climber	Belayer	Meaning
"On belay?"		"Is the belay ready?"
	"Belay on."	"Your belay is ready."
"Climbing."		"Here I come."
	"Climb" or "Climb on."	"Come ahead."
"Slack."		"I need some slack in the rope."
"Up rope."		"Take in the loose rope."
"Falling!"		"I'm falling! Brake the rope!"
"Tension."		"Hold the rope tightly in case I fall."
	"Got you."	"There's tension on the rope."
"Ready to lower."		"Lower me down the route."
	"Lowering."	"I'm letting you down now."
"Rock!"	"Rock!"	"Look out for falling objects."
"Rope!"	"Rope!"	"Rope being thrown down."
"Clear."	"Clear."	"It is safe to throw down a rope."
"Off belay."		"I no longer need a belay."
	"Belay off."	"I'm no longer belaying you."

Signals for Belaying Rappellers

The verbal signals used by rappellers are a little different from those of climbers, but the basic information they share is the same.

Rappeller	Belayer	Meaning
"On belay?"		"Is the belay ready?"
	"Belay on."	"I'm ready to belay."
"Rappelling."		"Your belay is ready."
	"Rappel on."	"Go ahead."
"Falling!"		"I'm falling! Brake the rope!"
"Off belay."		"I no longer need a belay."
	"Belay off."	"I'm no longer belaying you."
"Off rappel" or "Off rope."		"The rope is ready for the next rappeller."

Getting Out of a Belay System

In extremely rare situations, it may be necessary to remove the belayer from the anchor system. If the belay rope is attached directly to the anchor system with the belayer attached independently, it is very easy to do this.

1. Use a belay device with a mule knot (or a Münter hitch/mule knot with an HMS carabiner) to tie off the belay rope. (HMS stands for *halb mastwurf sicherung*, translated from German as "half clove hitch.")
2. The belayer can now detach from the system without affecting the integrity of the belay system.
3. Another belayer can clip into the system.
4. Untie the mule knot.
5. Resume belaying.

If the belay rope is attached directly to the belayer's harness and not directly to the anchor, the process is much more involved.

1. Attach a cordelette or webbing sling to the belay rope above the belay device using an appropriate friction knot. Put a locking carabiner in the cordelette or sling.
2. Attach another long cordelette or webbing sling to the anchor. Tie the other end to the carabiner in Step 1 using a mariner's knot. Tie off the belay device with a mule knot.
3. The belayer can now detach from the system.
4. Another belayer can now clip into the system.
5. Untie the mule knot.
6. Resume belaying.

CHAPTER 9

Climbing and Rappelling

TOWERS AND CLIMBING STRUCTURES

Anything man-made for the purpose of climbing is typically called an artificial rock wall, climbing tower, or face. These can be made of wood or a variety or composite materials that look very much like rock. To define a level of challenge, rock-like "holds" or "rocks" are attached to the surface via a bolt mechanism. Occasionally specific routes will be identified with same color holes or colored tape. By creatively placing holds, a single wall can contain a wide range of challenges from very easy to extremely difficult. Artificial climbing surfaces are very popular training areas for real rock climbing. They have the advantages of being designed to maximize safety while being flexible in the level of challenge provided. They also provide a climbing experience in an area where natural rock climbing surfaces do not exist. The setup process, operating procedures, and operating parameters for an artificial surface are defined well in advance of the operation and do not require a great deal of creativity in rigging. For this reason, a person not highly skilled in setting up anchor systems in natural areas can safely and successfully operate a tower or wall to provide sufficient challenge to complete a Climbing merit badge program. Like natural areas, artificial structures do have their nuances. This chapter will look at climbing and rappelling using artificial surfaces.

Anchors

Anchor systems on towers and artificial walls fall under the same inspection requirements as elements on a COPE course. Belays for climbing and rappelling are typically slingshot systems with the belayer on the ground and a master point at the top of the route. Attention needs to be paid to the position of the anchor point when setting routes. A climber should not be able to get too far out of the fall line from the anchor point. This introduces a pendulum effect into the fall, which increases the possibility of injury. Pendulum falls raise the torsion loads on the gear and can affect climbers on adjacent routes. Rappel activity line anchors must be set according to the current NCAP standards. Since jams and entanglements are the most credible incident scenarios, releasable attachments to rappel anchors can eliminate the need to have specialized rescue gear on hand for entanglement scenarios. A jam can be cleared with minimal impact on the participant and program timing.

Belay Pipes

Belay pipes are large-diameter steel pipes that have been attached to the climbing structure for use as a master point. Typically these are attached to the structure so that they cannot rotate and are backed up by a steel cable that runs through the pipe and attaches to the structure at both ends. For belay

systems, the large-diameter steel pipes serve well as a shear-reduction device by simply routing the belay line over the top then back down. For wide walls with many routes, this creates an almost infinite number of master point placements. When a heavy climber is being belayed by a smaller belayer, an extra wrap on steel can dramatically reduce the fall loads transferred to the belayer. The trade-off is that taking up rope can be physically more strenuous. Pipes can be rigged as releasable anchors in two ways. They can be wrapped as a "tensionless wrap" (see chapter 26, "Anchoring") or tied with either a mule knot and a belay device or a Münter hitch.

Belay Cables

Belay cables are simply stranded steel cables positioned such that a steel carabiner can be clipped to them to create a master point. They can be hung horizontally across one or more routes or vertically with a loop in the end. When strung horizontally, the master point carabiner will tend to "center seek" under load. This can create a dangerous situation if multiple master points are on the same cable. There are many techniques for attaching hardware to the cables to prevent center seeking. It is likely that the facility already has these in place, but they should be checked at setup to make sure they do not slide. When center seeking, the master point will always move toward the far cable anchor. In the absence of hardware, a piece of webbing can be tied to the nearest cable anchor and the master point carabiner as a redirect. Releasable rappels can be rigged to a carabiner using a mule knot and a belay device or a Münter hitch. Never use aluminum carabiners on steel cables. The hard steel cable can "saw through" the soft aluminum, resulting in very undesirable outcomes.

Belay cables should be regularly inspected for rust or environmental degradation. Occasionally a single strand or two of a cable will break. This protruding wire can tear through skin like a razor blade. It is important to always wear gloves when inspecting or placing hands on cables.

Anchoring to Poles

Anchoring to poles can be tricky if there has not been an anchor bolt or cable arrangement already designed into the pole system. For horizontal poles, one should consider using a tensionless wrap, webbing with a basket hitch, or a wrap three pull two. Tensionless wraps, basket hitches, and wrap three pull two are covered in chapter 26, "Anchoring."

For vertical poles, it is recommended that only bolt and cable systems be used for anchors. Wraps and hitches do not perform well when loaded perpendicular to their application. They tend to roll down or unwrap, pulling the anchor around the pole.

Rigging Climbing Belay Systems

Pulleys

Pulleys do one thing: they redirect tension force. A downward pull on a rope routed through an anchored pulley above creates almost exactly the same amount of pull upward on the other end of the rope. When a load is being lifted, it may not be obvious that the amount of force that the pulley exerts on its anchor is twice the amount of the load. This is because two lines are pulling downward with the same amount of force: one load and one pulling force. Pulleys can be used to create mechanical advantage. Generally, for every wheel added to a pulley system, additional mechanical advantage is gained. The payoff for being able to lift heavier loads with less pulling force is that the amount of rope needed is increased with each trip around the pulleys. So, a 4 to 1 system will be able to lift 100 pounds with 25 pounds of force. But moving that load 1 foot means 4 feet of rope must be pulled through the system (see chapter 12, "Mechanical Advantage Systems," for more information).

Connections

At the risk of sounding glib, connections are just that: they connect or attach things. In climbing and rappelling, there are numerous devices to establish connections. These include carabiners, knots, harness loops, static belay lines, and a myriad of cable connectors. Specific details are covered in chapter 8, "Life Safety Systems."

On a tower or climbing wall, you are likely to have a well-defined procedure as to where and how the connections are made. What is important to remember is that all of the connections from the participant to the belay anchor are solid and safe. Make sure the connections have been properly attached and the devices are properly configured for use. Examples include making sure harness buckles are doubled back, friction devices are properly configured, knots and backups are checked, and locking carabiners are down and locked. Throughout the day, periodic checks should be made to the connections in the anchor systems as well.

Ground Anchors

Ground anchors provide a solid ground attachment for the belay. Ground anchors can be posts or bollards deeply set into the ground, a screw-in type anchor, or perhaps just a big steel eyebolt set in concrete. Some facilities will use a single cable strung between two posts to attach multiple ground anchored belays. Center-seeking principles apply here too, so movement of the anchor attachment along the cable should be controlled.

Ground anchors (and others) can be rigged with the belayer either "in-system" or "out-of-system." In-system belay means that the belayer is one of the links in the chain. The belay device is attached to the harness in the front and the harness is attached to the ground anchor behind. This method more closely approximates a belay in a natural area as the belayer's body weight is the first mass to take the shock load of a fall. It also allows the belayer to have a much better feel for the climber. An in-system belayer can add a considerable amount of tension to the line very quickly just by sitting back. The belayer can also use whatever hand action he or she prefers—slip-slap-slide, chop, or BUS. In-system is an effective method but has some disadvantages. An in-system belayer has to "escape" the belay should he or she need to tie it off to deal with an incident. This escape can be time consuming and does require extra training. In-system can also be more tiring for the belayer if belaying a sequence of climbers.

An out-of-system belay has the belay device attached directly to the anchor via a short rope or sling. The belayer stands beside it. The advantage of this is that the entire load of the fall is directly transferred into the anchor and the belayer needs only break the fall using the belay device. The disadvantage is that the belay device position is to the side of the belayer, which may limit the hand method chosen. The belayer also uses the feel for the climber with this method and taking up slack involves pulling rope back through the belay device.

CLIMBING

Climbing on an artificial surface uses all of the body positions and hand/foot actions as one would use on a real rock surface. These are described in chapter 25, "Rock Climbing, Bouldering, and Aid Climbing." Care should be taken to develop good belayer–participant communication and to follow the CHECK system when starting a climb.

RAPPELLING

Rappel is a French word meaning "recall." Climbers use rappelling to descend steep cliffs by making a controlled descent of a stationary rope. Rappelling is a vital skill for anyone interested in becoming a well-rounded mountaineer. It is also a terrific activity for novices, giving them opportunities to learn something new, to increase their self-confidence, and to enjoy an activity they are likely to find exciting. For decades, people rappelled by wrapping rope around their bodies in ways that capitalized on friction to slow their descents. Rappel devices used by modern alpinists make rappelling more reliable, safer, and easier to master. Several belay devices are acceptable for BSA climbing and rappelling, including the figure eight device, Sticht plate, and other tubular devices. Belayers must be given specific instructions for using the type of belay device provided.

Rigging Releasable Rappel Systems

A releasable rappel system is one in which the activity line, or descent line, is attached to its anchor via a belay device or Münter hitch. It is rigged ready to lower and then tied off with a mule knot and backup knot or carabiner. The rigging can use any acceptable belay device, a tubular device, Sticht plate, figure eight, or Münter hitch. If using a Münter hitch, be sure to use a pear-shaped carabiner that the knot can fit through. D-shaped carabiners can badly jam a Münter hitch and render it ineffective. Tying the mule knot and rigging a releasable rappel system is not hard, but it does take some practice.

With all releasable rappel systems, extra rope at the top to let out slack is always handy and prevents the need to drop the line in the case of a release. Many

programs choose to set their rope lengths so that the participant can be lowered all the way to the ground. This means the activity line is a little more than twice the length of the rappel. Doing this does increase the amount of rope necessary, but rope wear is reduced because the line can be reversed with each use. For a fireman's belay with two releases, at least one of the ropes must be long enough to lower the participant all the way to the bottom.

Once the system is rigged, a participant who has become jammed in the activity line(s) can be either lowered to the ground in a controlled manner by releasing the line at the top or lowered enough to transfer all weight to the belay line, clear the jam, and then continue the activity. Some common scenarios using the releasable rappel are discussed below. It is important to realize that when using a releasable rappel system the belayer will have to work with a second trained person to release the rappel. Like all anchor hardware and connections, the releasable rappel should be monitored throughout the event.

Single-Rope Releasable Rappel

The preferred technique is to employ a static rappel line as the activity rope and to tie an independent dynamic belay into the rappeller's harness. If the static rappel rope is twice the height of the rappel, you have the option to lower the rappeller to the ground. If it is not long enough to go to the ground, it can still be an effective incident resolution component. If the rappel device becomes jammed, follow this procedure, being sure to clearly communicate among the rappeller, belayer, and instructor what is being done and why. Proceed methodically.

1. Tie off (with a mule knot) the dynamic belay rope.
2. Slowly untie the mule knot on the static rappel rope. With the belay device or the Münter hitch, lower the static rappel rope to create some slack. The rappeller is then supported by the belay rope.
3. Have the rappeller clear the rappel device.
4. At the anchor on top, take any slack out of the static rappel rope and tie it off again using a mule knot.
5. Untie the mule knot at the belay tied in step 1.
6. Lower the rappeller a few feet so that his or her weight is transferred back to the rappel rope. The rappeller may now continue the activity.

There are two alternative scenarios for this configuration:

- If the jam cannot be cleared in step 3, untie the belay lock and lower the participant all the way to the ground on the activity line and belay line simultaneously.
- If the activity rope is not long enough to lower all the way to the ground, transfer the participant's weight completely to the belay line, completely disconnect the activity line, and remove any hardware, tossing it down but out and away from the participant. Lower the rappeller to the ground on the belay line. Communicate, communicate, communicate; it would be most disconcerting to the jammed rappeller to see an untied rope go by without any explanation.

Double-Rope Releasable Rappel

Another common technique is to employ two independently anchored static rappel ropes with a fireman's belay. These must be twice the height of the rappel to have the option to lower the rappeller to the ground. For example, for a 40-foot rappel, each static line must have at least 40 feet of extra rope at the anchor. On each rappel rope, use either a belay device or a Münter hitch and a mule knot with a pear-shaped carabiner. If the rappel device becomes jammed, follow this procedure, being sure to clearly communicate among the rappeller, belayer, and instructor what is being done and why. Proceed methodically.

1. Have the fireman's belayer pull on the two ropes to lock off the rappeller. *This can be a delicate procedure if a body part is caught in the jam. Applying more downward force to brake the belay line may increase the pain.*
2. Slowly untie one of the mule knots on one of the static rappel ropes at the top.
3. Use the belay device or the Münter hitch to lower one of the static rappel ropes to create some slack. The rappeller is now being supported by the other static rappel rope.
4. Clear the obstruction from the slack rope.
5. At the anchor, take the slack out of the now-cleared static rappel rope and tie it off again.
6. Repeat the procedure with the other rappel rope. Both ropes are now clear, and the rappeller may continue the activity.

Anchors

Every rappel rope must be securely anchored. Anchoring systems must be set in line with the direction of the load that will be placed upon the rope. Rappelling may be done with either a single rope or a double rope. Because two ropes will generate more friction when wrapped around a figure eight, the descent of a double-rope rappeller will be slower than the rappel of someone on a single line. That additional friction may discourage rappellers from attempting to make rapid descents or from bouncing down the rock face, practices that can put greater strain on rope, hardware, and anchor points.

- A rope to be used for a single-rope rappel can sometimes be attached directly to a fail-safe anchor point such as a tree, using the coil-wrap/tensionless rigging method. Otherwise, tie a figure eight on a bight near the end of the rope (back it up with a safety knot) and clip the resulting loop to the anchor system with a locking carabiner.
- To anchor a rope for a double-rope rappel, find the center of the rope and use a locking carabiner to clip into the anchor system. Use two separate figure eight on a bight knots (or double-loop figure eights) so that the two ropes are independently attached to the anchor.

Rappel Rope

The established routes used by most BSA climbing and rappelling programs are of known height, so it is likely that a rope set up for rappelling will reach all the way to the bottom with plenty of slack to spare. Even so, instructors should get in the habit—every time they attach a rappel rope to an anchor—of making sure the rope is long enough so that there is no chance a participant can slide off the rope before reaching a safe, off-belay stance on the ground. A stopper knot must be tied in the end of the rappel rope to prevent anyone from rappelling off the end of the rope.

- **Rappelling with an independent belay.** The rappeller is connected to a belay rope tied directly to his or her harness with a figure eight follow-through knot backed up with a safety knot. The belay rope may or may not be connected to an anchor different from the rappel rope, depending on the type of anchor system used. As a belayer, begin by double-checking the belay system to be sure it is secure, that you are properly anchored, and that the belay device is correctly set. The bulk of the belay rope should be loosely piled next to you on your brake-hand side. Exchange verbal signals with the rappeller. As the rappeller descends, gradually release the belay rope through the belay device.
- **Fireman's belay.** To use the fireman's belay, position yourself at the bottom of the route and grasp the rappel rope or ropes. Exchange verbal signals with the rappeller. As the rappeller descends, be ready to pull down on the rope with enough force to increase friction on the rappel device and thus slow or stop the rappeller's progress. Some rappellers may wish to use an independent dynamic belay line in addition to a two-rope rappel.

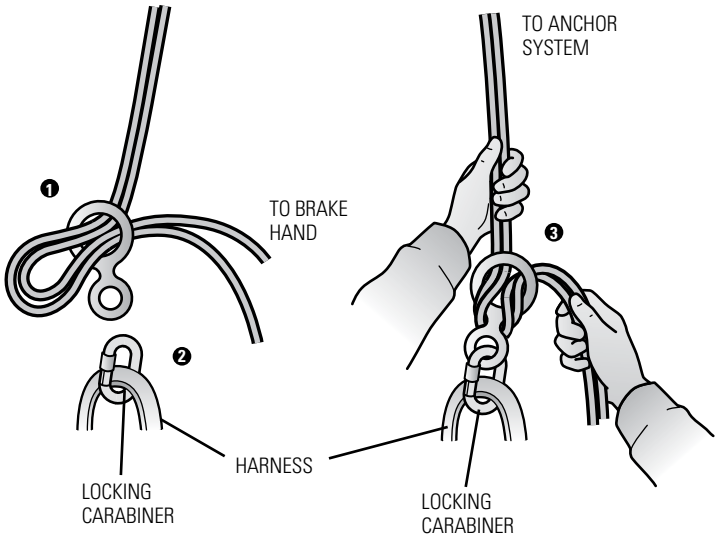
Why Rappellers Are Belayed

Belaying rappellers provides an important margin of safety, especially for participants with beginning and intermediate skills. Anyone involved in BSA rappelling activities must be belayed while rappelling.

Standardized routines at the site will help ensure the safe and orderly management of activities. Among the most important guidelines are these:

- Have in place a good communication system between participant and belayer to ensure the CHECK system has been implemented.
- Tie an appropriate knot or knots to the anchor system.
- For rappelling events, the belay rope is ideally set at a slight angle to the rappel rope to keep them from tangling or rubbing together.
- Belay and rappel lines should be anchored at the center top of the route.
- Use edge protection or other padding to protect ropes from the sharp edges of the wall if necessary.
- Participants using an independent dynamic belay for rappelling must be tied into the belay as soon as they approach the top of the rappel route. If they are attached to a safety line, they remain clipped into it until the belay rope has been secured and the rappeller is on belay. Once protected by the belayer, they can then secure themselves to the rappel rope.
- Never expose an unbelayed, unsecured participant or staff member to a dangerous situation. Everyone must be belayed or attached to a safety line before approaching the edge of a cliff. This also applies to any setup and takedown work.
- Long hair and loose clothing must be secured to prevent them from becoming entangled in the rope or hardware. Rings, watches, and dangling jewelry must be removed. Pockets must be emptied of any items that could injure a participant such as pens, pencils, combs, and items like compasses that have sharp edges. These can also become projectiles and endanger ground observers if they fall out at height.
- Rappellers are allowed to wear properly fitted leather gloves to prevent rope burns and improve control. The Level 2 instructor/director will determine if gloves are optional or required for his or her program.
- As with all climbing and rappelling activities, rappellers, belayers, instructors, and anyone else in the vicinity of the rappel route must wear a climbing helmet that is designed for climbing and is UIAA- or CEN-approved.
- Keep onlookers away from the fall zone where they could be in the path of falling objects.
- Instructors independent of the belayer should position themselves at the top of the route to prepare participants for rappelling, and at the bottom to help them disconnect from the rappel and belay ropes and move to a safe location. Instructors on the ground can also monitor the movement of rappellers on the face, direct traffic among participants waiting their turns to climb, and in other ways keep the operation running smoothly.

Figure Eight Descender



The most commonly used rappel device is the *figure eight.* To secure it to a rappeller, form a bend in the rappel rope. Feed the bend through the larger opening of the figure eight, then loop the bend over the smaller portion of the device. If the rappeller is right-handed, the rope should hang from the right side of the figure eight (from the left side for a left-handed rappeller). Next, use a locking carabiner clipped into the smaller opening of the device to secure the figure eight to the rappeller's harness.

A right-handed rappeller should consider the right hand to be the brake hand. Grasp the trailing end of the rappel rope with the brake hand and bring it tightly alongside the right buttock. **The brake hand**

must never leave the rope! (For left-handed rappellers, the left hand is the brake hand, and the rappel rope passes along the left side of the body.) As the rappeller backs down the cliff, friction created by the rope's motion through the rappel device will slow the descent. The rappeller can control the speed or completely stop the descent by pulling the rope more securely against the body with the brake hand. (Participants who have experience with belay and rappel devices may recognize that the principles involved in rappelling with a rappel device are somewhat similar to those practiced by belayers.)

An instructor stationed at the bottom of a rappel can monitor the progress of each participant and provide guidance and encouragement. That instructor might serve as the belayer, standing ready to place tension on the end of the rappel rope (a fireman's belay) to help a participant control the rate of descent.

Rappelling Technique

Rappelling is usually a matter of simply walking backward down the face of a wall while controlling one's speed with the rappel device. A seasoned rappeller should have no difficulty with that concept, but novices can find it completely counterintuitive to lean backward over open space. They may be nervous and even fearful. One way to help beginners is to provide introductory training on flat ground or on a small hill. Participants can be instructed to lean backward until they are sitting on the ground.

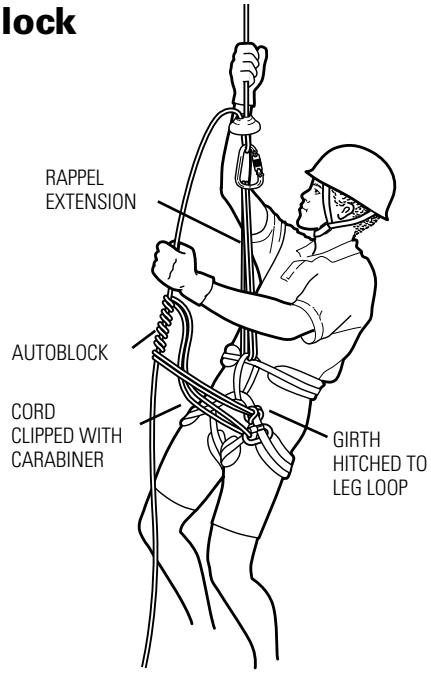
Instructors can help participants overcome their concerns by helping them understand that the anchors are secure, the belayer will provide a backup, and the basic rappelling technique will ensure a safe trip down. Recognizing the anxieties of rappellers and guiding them in a calm, reassuring manner will greatly enhance the experience for participants and for instructors.

After a participant has been secured to the belay system and the rappel rope, the instructor at the top of the route must double-check the way the participant is tied into the belay and rappel ropes, see that the belayer is positioned and ready, and make a quick visual survey of the anchoring systems. Use CHECK.

When everything is in order, the rappeller may commence in the following sequence:

1. Always keep the brake hand on the rope and alongside and behind the hip.
2. Exchange the correct verbal signals with the belayer. Back to the edge of the cliff and position the feet shoulder-width apart.
3. With knees slightly bent, lean back and place body weight on the rappel rope. The correct position is similar to sitting in a lawn chair.
4. Take small steps and walk backward down the face, slowly releasing rope through the rappel device. The rappeller should start backing down with the feet just before reaching a horizontal position at the edge of the wall to avoid being inverted. Keep the feet flat against the wall and the weight on the heels.
5. Instructors should discourage rapid descents, bounding rappels, pendulum swings, and any other actions that can put unnecessary strain on the rope and anchoring systems. Instructors must also set a good example by using proper technique whenever they are rappelling.

Autoblock



An autoblock is a loop of accessory cord wrapped around a rappel rope. Useful as a backup for novice rappellers, an autoblock can stop a descent and free the rappeller's hands. It also serves as a backup when a lightweight belayer belays a heavy rappeller. Using a 24-inch sling of webbing or 5- to 7-millimeter accessory cord, tie a girth hitch to the brake-hand side leg loop of the rappeller's harness. Wrap the doubled accessory cord or webbing four times around the rappel rope below the rappel device. Using a nonlocking carabiner, clip the remaining accessory cord or webbing loop into the same leg loop as the girth hitch. Alternately, the beginning loop of the autoblock may be clipped into the leg loop.

Instruct the rappeller to hold the top of the autoblock (the four accessory cord wraps) with the brake hand while rappelling. If the rappeller removes the brake hand from the rope, the autoblock will hold the rope in place and stop the rappeller's descent.

Beginning Descents

A key role for instructors at the top of a rappel route is helping rappellers position themselves to begin their descents. It is easier to negotiate the edge if the rappel rope is anchored above the rappeller's waist height. Anchoring the rappel rope at a point lower than waist height puts increased forces on the legs of the rappeller and might not be appropriate for beginners. Remember that everyone near the cliff's edge, including the instructor, must be secured to a belay or a safety line.

CHAPTER 10

Equipment Control and Inventory

The gear used for operating COPE and climbing programs has been developed over more than 150 years of serious mountaineering. The Union Internationale des Associations d'Alpinisme, or UIAA, is a group of mountain travel experts that sets standards and testing procedures for climbing equipment. The European Committee for Standardization (known as CEN) has similar standards for excellence. All ropes and hardware used by Scouts or Venturers for COPE and climbing programs must be designed for climbing and/or have UIAA, CEN, or National Fire Protection Association (NFPA) approval. Almost all climbing equipment sold by reputable dealers has that approval, but insist upon seeing proof, usually in the form of a brochure accompanying a new piece of gear or the UIAA, NFPA, or CEN stamp somewhere on an item.

PROCUREMENT

All specialized COPE and climbing equipment must be made specifically for these activities and must be acquired new from reputable suppliers. These sources of equipment **ARE *NOT* ACCEPTABLE:**

- **Army surplus.** Military gear has specifications different from equipment for climbing and rappelling. The history of individual items may be unknown. **Do not use army surplus equipment.**
- **Fire and rescue equipment.** Firefighters and rescue teams sometimes give away used equipment. However, a single hard use under the extreme conditions of firefighting or rescue operations can make an item unsafe. **Never accept this type of equipment, even if it has been used only once.**

VISUAL AND FORMAL INSPECTIONS OF GEAR

Determining the condition of gear to be used for BSA COPE and climbing programs requires two levels of safety inspection—visual and formal. The two levels give maximum opportunities for discovering problems with gear that may have arisen since its last use and for observing any long-term wear or deterioration caused by use or exposure to stresses such as weather. Never modify or alter a climbing harness or any other piece of climbing equipment because this may render it unsafe as well as invalidate the manufacturer's warranty.

Visual Inspection

An instructor must visually inspect all COPE and climbing equipment just before it is put into use. Instructors conducting visual inspections should look for anything that could indicate a problem with a piece of equipment—frayed webbing or harnesses, damaged hardware, etc. Give every rope an inch-by-inch hand and eye examination. Any piece of gear that arouses suspicion must be put aside pending a more thorough inspection to determine whether the item in question should be removed from the inventory for proper disposal.

Formal Inspection and Inventory

The local COPE and climbing committee must conduct an annual inspection of facilities and equipment as well as maintain an inventory of equipment. In addition, equipment and facilities must be inspected annually by a third party (a challenge course builder).

Records must be maintained on all aspects of all BSA COPE, climbing, and rappelling programs. These records can provide valuable information for future program planning and for accurate management of equipment. Each piece of equipment should be marked so that its history can be tracked. Detailed records should be kept for ropes, helmets, and harnesses with an item description, including date of purchase, date put into service, eventual date of retirement, and unusual incidents.

HINTS FOR MARKING EQUIPMENT

- **Helmets**—Write identifying numbers and the date of purchase inside with a permanent marker.
- **Hardware**—Never scratch or file marks on carabiners, belay or rappel devices, or other hardware. Instead, place colored tape on a part of the hardware that will not interfere with its function. The color can be keyed to the item's year of purchase. (Hardware can sometimes be purchased in various colors, which may aid in tracking its history.)
- **Harnesses**—Mark a number and the date of purchase on the label of each harness. Do not mark on the waist belt itself as the ink might affect the integrity of the harness.

KEEPING AN INVENTORY

A useful format for keeping an inventory is a loose-leaf binder divided into sections for various types of information. Pages can be added over time. Districts and councils may also be able to draw upon the skills of computer-literate volunteers to set up computer programs for their record keeping.

Equipment records usually have three major sections.

- The first section contains the usage records for helmets, harnesses, and ropes. It also contains information on other items in the climbing and rappelling cache—carabiners, webbing, rappel devices, etc. For each item, write down the size, type, brand name, supplier, date of original purchase or initial service, and descriptions of any significant stresses the item has sustained.
- The second section contains the outcome of each semiannual inspection, noting results, recommendations, and verification that any recommended maintenance or replacement has been completed.
- The third section contains records relevant to participants and staff members. It is made up of participant rosters, dates of participation, records of accidents or close calls, medical information and/or informed consent forms, participant evaluations and suggestions, and staff debriefing records.

All equipment should be stored in a securable location, such as a locked tower or shed.

RETIRING EQUIPMENT

Equipment that has been damaged or has reached the end of its safe lifetime must be rendered useless by altering it in such a way that it can never be accidentally used for any climbing, rappelling, or belaying activities. Never give away retired equipment; that leaves open the possibility of its being put back into service.

- **Carabiners**—Retire by breaking off the gates to render them unusable.
- **Harnesses**—Retire by cutting apart with scissors.
- **Ropes**—Retire by cutting into 15-foot or shorter lengths.
- **Helmets**—Retire by snipping edges with a cutter, then smashing and cutting out the webbing.

CHAPTER 11

Pre-Use Inspection

The first level of safety inspection at a COPE or climbing site must occur just before the use of a COPE event or just before climbing activities begin, and is done by the director or instructor who will facilitate a group through a challenge. This investigation reviews the conditions of the environment at the site, the soundness of the structure (if applicable), and the condition of the equipment to be used during the activity.

Equipment for COPE events must pass both a visual inspection and a leader's weight test to ensure that the activity will be safe for participants. Instructors or the director should follow a written checklist that includes specific points to be inspected on each event. The instructor or director does not open an event until every item on the checklist has been found to be in satisfactory condition.

APPROPRIATE PAPERWORK

Proper emergency preparedness should also include the following:

- Collect completed and signed release forms (for non-Scout groups).
- Review medical information on participants for potential problems, allergies, chronic conditions, and restrictions.
- Determine that emergency access roads are clear.
- Provide complete first-aid kit at the site.
- Determine that emergency communications are working.
- Determine that on-site emergency vehicles are available.
- Ensure that at least one person with current CPR and first-aid certification is available on-site during the activity (Wilderness First Aid for activities located more than 30 minutes from a roadway accessible by emergency vehicles).

PRE-USE EQUIPMENT INSPECTIONS

Follow these guidelines before using equipment.

- **Helmets**—Inspection shall include assessment of the shell, absorption material, suspension system and fasteners, and buckles. The inspector shall assess helmet integrity with consideration given to fractures or other damage to the shell; damaged or defective absorption material including mold and mildew; defective suspension system; corrosion on metallic fasteners; broken or defective buckles; strap material condition; age; and use.
- **Harnesses**—Inspection shall include an assessment of webbing and stitching, belay/rappel loops, and any metallic components including built-in D-rings or buckles. The inspector shall assess harness integrity with consideration given to damage to the webbing material or stitching; discoloration or deformity of the webbing material; defective or deformed metallic components; age; and use.
- **Lobster claws**—Inspection shall include an assessment of the following: knots, splicing, and stitching; strength reduction from the termination; and condition of the energy (shock) absorber, lanyard material, and metallic components (including built-in connectors or buckles).
- **Carabiners**—Inspector shall assess the severity of any degradation on the integrity of the connector. The inspector shall assess connector integrity with consideration given to scoring, cracking, corrosion, area reduction, material incompatibility, defect in gate operation, hinge, locking mechanism, and deformation.
- **Belay devices**—Inspection shall include an assessment of the following: presence of significant scoring, grooving, wear, or sharp edges; damage or defects; and improper operation of moving parts. The inspector shall assess the impact on the performance of the device from any problems found.
- **Rope**—Inspection shall include assessment of rope or cordage integrity with consideration given to wear, cuts, discoloration, or glazing; stiffness, softness, or inconsistency; change in diameter or bend radius; unknown or suspect history; age; and use.
- **Pulleys**—Inspection shall include an assessment of the following: operation of moving parts; defects or damage to metallic components including scoring or grooving; loose or damaged bearings or bushings; damage to the axle or fasteners; and corrosion. The inspector shall assess the pulley's integrity and suitability for use relative to the severity of any problems found.
- **Utility ladder**—Inspection shall ensure that rungs are not bent or cracked and stringers are not bent or deformed.
- **Site**—Inspection shall ensure that the site is clear of ground hazards (holes, rocks, etc.) and environmental hazards.

Remove any item that fails inspection. *Close* any site that fails inspection.

CHAPTER 12

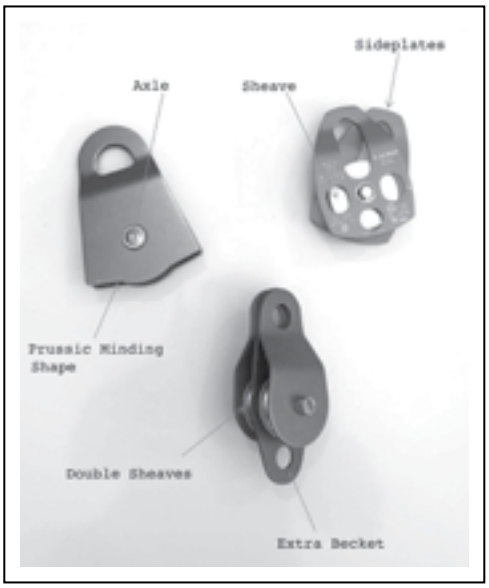
Mechanical Advantage Systems

Mechanical advantage is the ratio of load lifted to the force applied to move the load. A 3:1 mechanical advantage lifts a load three times as great through application of one unit of force to the haul line. The haul line must be moved 3 feet to lift the load 1 foot. Mechanical advantage systems trade distance for force. Deciding which mechanical advantage haul system to use for any given situation will depend on the weight of the load needing to be hauled, how many people can be on the haul team (force available), the equipment available, and the space available in which to work. Mechanical advantage systems generally utilize pulleys; however, pulleys are not required and the rope can pass through a carabiner instead. Using carabiners in place of a pulley will add friction to the system and make lifting a load more difficult.

TYPES AND PARTS OF PULLEYS AND MECHANICAL ADVANTAGE SYSTEMS

There are several parts to a pulley: axle, sheave, bearings or bushings, side plate, and extra becket.

The axle is the bolt that the pulley sheave spins around. The sheave is the wheel that spins around the axle. Sheaves are commonly made of aluminum, steel, or plastic (nylon). Pulleys used on steel cable must have a steel sheave. The sheave rides around the axle on bearings or bushings in the hub of the pulley. Sealed bearing pulleys are slightly more efficient than bushing pulleys and are more resistant to dirt and weathering. Bushing pulleys are generally lighter, spin more freely, and are less expensive. Additional features of pulleys can include swiveling side plates (cheeks) for easy rope loading; a solid frame housing that the end of the rope

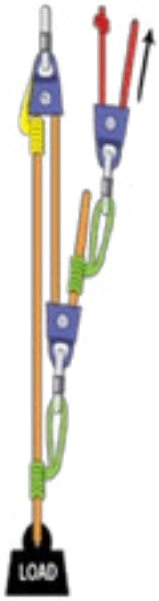


must be fed through; and an attachment point on the opposite side of the main attachment point called an extra becket for adding pulleys or clipping in the end of a line for increased mechanical advantage. The pulley may be manufactured with built-in backups in the pulley frames. This type of pulley should be used in applications where the pulley cannot be inspected on a daily basis. Pulleys might have a cammed device to act as a built-in progress capture that keeps the rope from slipping back after it has been hauled forward.

There are many types of pulleys available for different functions. Double- or triple-sheave pulleys can increase mechanical advantage by creating "block and tackle" type systems. Knot-passing pulleys allow for the passing of a knot joining two ropes. A zip-line pulley (trolley) has inline sheaves for traveling along a tension rope or cable.

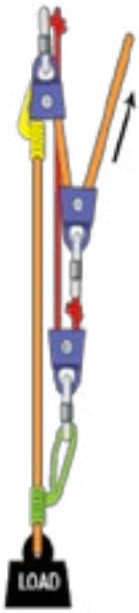
Mechanical advantage haul systems built with pulleys can be simple, complex, or compound. In simple systems, the moving pulleys and the load all move toward the anchor at the same rate of speed. To calculate the mechanical advantage of a simple haul system, count the support lines.

Courtesy R. Carlson



Compound systems are composed of two or more simple systems acting upon each other. A compound system's mechanical advantage is the product of the simple systems from which it is constructed (e.g., a 2:1 acting on a 3:1 = a 6:1). Traveling pulleys move toward the anchor but not all at the same rate.

Courtesy R. Carlson



Complex systems have some combination of simple and compound systems. They may have pulleys moving in opposite directions at different rates of speed.

Courtesy R. Carlson

CHARACTERISTICS OF MECHANICAL ADVANTAGE SYSTEMS

In creating a mechanical advantage system, consider the need for a progress capture. A progress capture prevents the rope from going backward through the system. Those who are hauling may need to rest or change position, or the haul system may need to be reset. The progress capture also prevents accidentally dropping the load. Examples of progress capture are Prusik hitches, a Prusik hitch with a Prusik minding pulley, self-assisted braking devices (e.g., Grigri), or the friction device of the primary belay.

Pulleys attached to the anchor only change the rope's direction (they do *NOT* add mechanical advantage). Traveling (moving) pulleys result in mechanical advantage.

Consideration also needs to be given to raising power. A good rule of thumb is to use a 3:1 for a one-person load or a 5:1 for a two-person load. Hauling power should also be a concern. If the number of haulers multiplied by the mechanical advantage of the system gets much greater than 12 (e.g., a 3:1 with more than four haulers), the system may have too much raising power. If the load being raised catches on an obstruction, too much raising power may damage the item being raised and overstress the system.

In deciding how haul systems are to be built, consideration needs to be given to the amount of rope that will be played out and when the system will be applied to the rope. A 4:1 mechanical advantage system rigged with double-sheave pulleys will require more rope than a compound 4:1. However, the 4:1 with double-sheave pulleys can be prerigged and blocked up, waiting in a rescue bag.

When building a haul system that will attach to the main line, a haul cam can serve as the "ratchet" device, allowing the haul system to be reset. The haul cam (or triple-wrapped Prusik) attaches to the main line between the anchor and the load. A Prusik will usually slip if tensioned too tightly. That slipping will serve as a warning sign that an obstruction is likely keeping the load from being raised. Cordage used for the Prusiks in mechanical advantage systems should be no smaller than 7mm. A mechanical ascender is more likely to damage or cut the rope if overtensioned. Avoid toothed cams; they are not rated for this type of load and can cause rope damage under rescue loads.

A 2:1 system can be used to lift short distances, such as in lifting a person back onto an element from which he or she has slipped. Another application would be to help a climber past a crux. Be careful not to use a 2:1 in a system that would drag a pulley over an edge or catch it on an element.

A 3:1 system could be used to hoist a participant on a natural site, to raise a person out of a cave, to raise a special needs participant to an element, to raise a person back up onto an element, or to lift a staff member or rescuer to assist a participant. A top-roped belay line can be converted to a 3:1 to lift a climber.

An application of a 4:1 system would be to raise a rescuer to a participant who needs to be rescued. This system will probably need to raise the load of the rescuer and the participant high enough to get the weight of the participant off of the original belay or safety system. A 4:1 is commonly built with double-sheave pulleys and may be able to be prerigged in a bag.

Applications of a 5:1 system are similar to the uses for a 3:1 but when more mechanical advantage might be needed due to the distance the load needs to be raised. Another reason to need more mechanical advantage might be because there aren't enough people around for the haul team.

CHAPTER 13

Emergency Preparedness

EMERGENCY RESPONSE PLAN

BSA COPE and climbing committees should prepare a written emergency response plan for each site that will be used for COPE, climbing, rappelling, or bouldering activities. The plan should also include basic information such as:

1. Location of the nearest telephone: _____
2. Telephone numbers for:
   - Local emergency response system (usually 911): _____
   - Nearest hospital: _____
   - Nearest police station/sheriff's office:_____
   - BSA local council Scout executive:_____
3. Directions and perhaps a map detailing how to reach the nearest clinic, hospital, or life flight service.

The council's emergency response plan should detail different types of first aid that staff members are trained to administer. The types of first aid should not go beyond what is covered in an eight-hour basic first-aid session. The first-aid kit that is on the program site should support only those treatments that are listed in the emergency plan and in the staff training plan. The emergency response plan should list certain medical scenarios for which the staff will seek outside help and how to summon that outside help. The plan should also detail what means of electronic communication are used by the program staff, how emergency vehicles can access the program site, and how people will be evacuated to the closest point a vehicle can reach.

The council's emergency response plan should be specific in listing elements of the program and the types of rescues that would be used on which events based on the equipment the council has in its rescue pack and the condition of the participant. The plan should specify where the rescue pack is located during the program and which staff members will perform the needed rescues. Multiple rescue packs may be needed based on the size of the program site.

The onsite rescue pack will have the equipment to support the rescue techniques in the emergency response plan. The response plan will specify what to do with other participants while a rescue is being performed.

The council's emergency response plan should give guidance as to what types of weather will stipulate the program being shut down. There should be considerations made for wind, lightning, rain, excessive heat, snow, or ice. The plan should include a wait time if the staff feels the weather might pass.

The council's emergency response plan is tied into the staff training plan so that the program staff knows which rescue techniques and which first-aid treatments they are to perform based on the condition of the participant.

SUMMONING AID

Put this in your first-aid kit for ready reference.

Reporting Aid

When calling for outside assistance, either by dialing 911 or by sending responsible individuals to summon help, inform authorities of the following:

- The exact location and community or coordinates where the incident occurred and directions to the accident site, including mileage from a known location.
- A description of the injured parties, including name, number of people involved, age, height, weight, and vital signs if they can be easily determined. (Vital signs are the body temperature, pulse rate, and respiration rate.)
- There has been an accident and help is needed with a rescue.
- What has happened.
- The height of a fall.
- Responsiveness and sensation to touch. Do not move a person who has fallen (wait for emergency medical service personnel).
- What is being done for the victim(s).
- Whether an ambulance is needed.
- Who is presently with the injured parties and what is known of their general level of first-aid and rescue training.

Finally, after the report has been called in, remain on the line until help arrives or those you have called give you other instructions. Be sure to give a callback phone number before hanging up.

What to Do If an Accident Results in an Injury

- Make certain no one else is in danger.
- Administer first aid and treat for shock.
- Assess the situation and, depending on the seriousness of the injury, do one of the following:
  - Call for assistance (police, fire department, rescue team, etc.).
  - Arrange for safe transport of the injured to a local medical facility or the participant's home.
  - Have the injured person sit out the remainder of the day's activities and return home with the group.
  - Allow the person to resume participation in climbing/rappelling activities.
- Keep an accurate log of an injured participant's condition, starting at the time of the accident. Include pulse, respiration rate, skin color, and level of consciousness, and note any changes in the participant's status.
- Write down an accurate record of the treatment given to an injured person and the overall handling of the incident. Get names, addresses, and phone numbers of eyewitnesses. As soon as it is appropriate, ask each witness independently to write down his or her account of the event.
- If injuries were serious, contact your local council Scout executive.

What to Do If an Accident Results in a Fatality

- Ensure the safety of the rest of the group. Do not allow the stress of the situation to compound the emergency.
- Do not disturb the body. Investigating authorities will determine when and how it will be moved.
- Do not disturb the area immediately around the body. Legal authorities will make a careful investigation of the site. Leave all ropes, anchors, and hardware as they were at the time of the incident.
- Notify the council Scout executive, who will, in turn, contact other appropriate authorities and report what has happened.
- Make an accurate written record of the incident. Get names, addresses, and phone numbers of eyewitnesses. Have every willing witness immediately write a longhand narrative report describing the specifics of the incident. Be sure each person signs and dates the report.

Online Reporting Procedure for Injury or Illness

Check with your council and follow its policy for using the online reporting form. It can be found at www.MyBSA.org. Click on "Resources," "Risk Management," and "Incident Information Report." All injuries, illnesses, and incidents requiring the intervention of a medical provider beyond basic Scout-rendered first aid must be reported using this system. Camps with limited or no Web access will need to capture the information using the reporting folder or forms and establish a method to enter the incidents within five working days. Near misses in COPE, climbing and rappelling, or pilot programs must also be reported using this method. If an incident involves a fatality or multiple serious injuries, please follow the crisis communication plan included in the reporting folder.

What to Do in Any Accident or Emergency Situation

- Do not contact the news media.
- Do not make any statements to the news media. Refer all inquiries for comment to the local council Scout executive.

After an Emergency

At the conclusion of an incident resolution or the treatment of an injured person, it may be wise to discuss the events with the other participants and allow them to ask questions and share their feelings. Arrange for a post-traumatic event debriefing by a capable provider for the benefit of youths and adults who were present during any phase.

Instructors and directors who have witnessed close calls or who have been involved in response efforts, especially if the injuries were severe or the scene was traumatic, may benefit from further discussions with qualified adults who can help them understand and deal with the emotions they are experiencing.

Soon after the incident, the climbing director, instructors, and other appropriate personnel of the camp, district, council, or council high-adventure base should review the events, determine the cause of the accident, and develop strategies for preventing a recurrence.

Preparation for Emergencies

Emergency preparation entails four components: participants, staff, equipment, and policies.

- *Participants* need to be physically and emotionally prepared for high-adventure activity. This begins with appropriate clothing and warming up, as discussed elsewhere in this manual. Depending upon the length of the program, its status as part of a regular summer camp or high-adventure experience, and the age of the participants, participants may or may not have class 1 (recent complete physical examinations) health records. Indeed, research into large databases of challenge course incidents rarely shows any that a physical examination would have prevented. On the other hand, all participants should have an updated Annual Health and Medical Record available. This record should be reviewed for issues (e.g., allergies, asthma requiring medication) that could be relevant to participation. It must be remembered that addressing these issues should be broad-based. Knowing that a participant has allergic reactions to bee stings or insect bites, for example, requires more than the availability of an EpiPen. Much more important is a policy and process for recognizing and removing sources of exposure on the course.
- *Staff* must include an individual with appropriate training and current certification who is designated as the course first-aider. Currently, "appropriate training" is defined as the American Red Cross standard first-aid course, although many programs are requiring a more advanced level of training such as the American Red Cross's Wilderness and Remote First Aid course. There is no evidence that training beyond this (e.g., Wilderness First Responder) provides any additional level of safety to the program. Although sudden cardiac death has never been reported in a youth participant in a BSA COPE or climbing program, there will always be adults present on courses. Thus, current certification of at least one staff member in CPR (generally by the American Red Cross or the American Heart Association) is also required.
- *Equipment* for first aid and incident resolution must be available at the course and must be appropriate for the site and the training of the staff. For example, the first-aid equipment needs of a course located in a central area of an established resident camp that includes a fully stocked and staffed first-aid office will be minimal. Similarly, the use of equipment such as backboards and cervical stabilization devices is outside the scope of training and practice of individuals with standard first-aid credentials. The presence of such devices on a course should be discouraged. An evidence-based list of first-aid supplies for a COPE course or climbing site is provided in the next section.
- *Policies* are the fourth component of comprehensive emergency preparedness. Again, these need to be site-specific and need to include the specific program's requirements for first-aid and CPR certification, the screening process employed (if any), location and checking of emergency equipment, access to the course by emergency medical services (EMS), and communication. The availability and expertise of the local EMS provider is crucial in establishing these policies. The needs of a course for which advanced life support capability is available within minutes are clearly distinct from those in a more remote location. Similarly, the rapid availability of EMS or rescue services with a boom lift that can access the course should drive policies for emergency removal of participants from elements.

Always have a well-equipped first-aid kit close at hand.

First-Aid Supplies for Courses

Many of the published recommendations for contents of first-aid kits are not evidence based. The following list is based upon studies reporting the types of incidents encountered on challenge courses and at climbing sites, as well as the supplies appropriate for use by an individual with the training and certification outlined above.

- **Communication device:** site-specific. For a program operating in an established resident camp, the "device" may be nothing more than a staff member able to walk to the camp office. In other circumstances, cellphones or other wireless devices may be required. In such circumstances, it must be established that reliable service is available from the course site and that an appropriate individual is always in place to respond to the call.
- **Orthopedic supplies:** source of ice; 3-inch elastic bandages (Ace® or similar); triangular bandages; splinting material (such as a Sam Splint®).
- **Wound care supplies:** source of soap and running warm water; topical antibiotic ointment (e.g., Neosporin®); heavy grade scissors; fine tweezers for splinter removal; adhesive bandages (Band-Aids®); 2-by-2-inch and 4-by-4-inch sterile gauze pads; cloth adhesive tape (1-inch and 2-inch rolls); compound tincture of benzoin (to improve adherence of tape onto skin).
- **Eye care:** eye pads; contact lens supplies (container and sterile saline solution).
- **Dental supplies:** gauze pads and saline solution (as per above) for teeth that have been knocked out.
- **Environmental care:** sunscreen; insect repellent; blankets; rain protection.
- **Over-the-counter medications** (as approved by the program's medical professional): chewable aspirin tablets (81 mg for adult cardiac emergencies); 1% hydrocortisone cream (for skin lesions); analgesic of choice (acetaminophen or ibuprofen).
- **Cardiac emergency supplies:** chewable aspirin (see above); rescue breathing device/barrier. (There are no data supporting the need for the presence of automated external defibrillators (AEDs) on challenge courses or at climbing sites, although some local regulations may require this in certain settings. If a program chooses to include AEDs, appropriately certified staff must be available and policies for location and checking of equipment must be in place.)
- **Universal precautions supplies:** nonlatex gloves; plastic bag for used supplies. (There may be more specific requirements in specific jurisdictions; consult with your local health department.)

Note that recommendations regarding equipment for emergency access to the course and for securing and lowering participants in emergencies are not included above. These vary with the location of the course, its elements, its accessibility, and specifics of its construction. Thus, this equipment is completely site-specific.

General First-Aid Guidelines

The recommended training programs requisite for first-aid certification should provide the most current information on addressing illness and injuries on courses. The following guidelines provide some additional information that is particularly pertinent to COPE and climbing programs.

- **Skin injuries:** Abrasions, cuts, and scratches are very common in most outdoor programs. The major risk of such injuries is infection. Indeed, the past few years have witnessed an explosion of very serious bacterial infections initially triggered by seemingly trivial skin lesions. Thus, the most important part of first aid is cleaning these wounds. Using soap and warm water, especially for very dirty abrasions, is the first step in this process. Application of an antibiotic ointment afterward will further aid in the prevention of infection. Puncture wounds (especially those occurring through footwear) and lacerations with greater than ½-inch skin gap require physician evaluation.
- **Fractures:** Fractures of the collarbone (clavicle) and wrist (distal radius) are the most common fractures in challenge course programs. They overwhelmingly occur during initiative games or low elements. A malleable aluminum splint (Sam Splint®) is ideal for the latter injury. Although figure eight dressings and commercial clavicle straps are often recommended for collarbone fractures, in practice most patients discard these items after a day or so. Both of these injuries obviously require further medical evaluation, although in the absence of other injuries they do not require urgent evacuation.

- **Head injuries:** Serious head injuries in COPE or climbing programs result from either falls (generally from a height greater than the participant's height) or contact with dropped objects. Severe head injuries (e.g., those with lasting unconsciousness, large skull wounds, vision complaints, irritability, and/or instability) require immediate professional evacuation. While awaiting definitive EMS response, keep the participant warm and dry, moving him or her only if necessary for safety. Bleeding wounds should be addressed and the ABCs (airway, breathing, circulation) should be carefully monitored. Head injuries associated with brief loss of consciousness (under five minutes) followed by complete recovery are likely to be concussions. Even if recovery from a concussion seems rapid and complete, there is increasing concern that concussions can have lasting neurological consequences. Thus, although not as urgent as is the case with more serious head injuries, participants with suspected concussions must also receive definitive medical evaluation.
- **Ankle sprains:** These are usually "trip and fall" injuries, typically involving the outer (lateral) aspect of the ankle. The mainstay of therapy—RICE (rest, ice, compression, and elevation)—has been little changed in decades. Although rarely serious, ankle sprains may sometimes hide deeper bone injuries and may result in long-term ankle instability. Thus, definitive evaluation is appropriate, although certainly not urgent.
- **Dehydration and heat emergencies:** This has been a confusing area of first-aid teaching for many years. The condition often called "heat exhaustion" is nothing more than dehydration occurring in a warm environment. Exercise in warm environments causes the body to lose water faster than usual. Dehydration is not an all-or-nothing condition; rather it occurs on a continuum. As one develops an increasing deficit of water, performance—both mental and physical—erodes. Thus, the belayer with early dehydration may not be as attentive or physically agile when needed. Dehydration, aka "heat exhaustion," is prevented by regular, easy access to water at all times. Heatstroke is another condition altogether. It is a complete breakdown of the body's temperature regulation system. Virtually all cases of heatstroke occur in the elderly or chronically ill or in individuals who are severely overexercising in a hot environment. Heatstroke is not a condition that will be encountered in a COPE or climbing program.
- **Hypothermia:** As is the case with dehydration, hypothermia occurs on a continuum. Profound, life-threatening hypothermia is unlikely to be encountered in a typical COPE or climbing session. However, some of the earliest manifestations of hypothermia involve difficulties with judgment and focus, as well as clumsiness. Consequently, even mild hypothermia can become a risk to a climber or belayer. Instructors must include hypothermia as part of an environmental briefing at the start of a program where conditions (wet, chilly, windy, exposed, much down time) present a risk. It is often not appreciated that dehydration is a major risk factor for hypothermia. This is important because the types of weather conditions presenting a risk for hypothermia are not ones in which instructors typically worry about fluid intake among participants.
- **Potential cardiac emergencies:** This is obviously a concern for adult, not youth, participants. Training in the recognition and management of potential heart attacks is included in CPR courses. The current recommendation of the American Heart Association is for the administration of one "adult" (325 mg) or four chewable or "children's" (81 mg) aspirin once it is established that an individual is possibly having a heart attack and is not allergic to aspirin. Chewable aspirin is easier to administer.

Record Keeping

When COPE or climbing activities are components of a regular resident camp program, the camp's first-aid log should be used for recording any incidents requiring first aid or definitive medical evaluation. Outside resident camp, it is still important that there be a written record of any first aid administered. Ideally, this should be in a numbered, bound book, with ink entries that are made contemporaneously. Entries in a first-aid log should be simple descriptions of what one observed and what one did. They are not the place for "diagnoses."

INCIDENT RESOLUTION

There is little need for rescues in a well-managed COPE or climbing program with a well-trained staff. The concept of a "rescue" implies that an individual has gotten into a place or a situation that demands specialized equipment and expertise for safe removal. While occasional mishaps are probably inevitable in outdoor adventure activities, it should be exceedingly rare for these to demand much more than common sense, good judgment, and some basic skills. This concept has led the industry to teach "incident resolution" instead of "rescue." Similarly, we do not assist "victims" but rather "participants."

In the past, the bulk of "rescues" in COPE or climbing activities resulted from entanglements or malfunction of rappel devices or climbers getting themselves into situations from which they could not move. When properly set up, dynamic top-roped belay systems and releasable rappels should make it possible to lower participants from such situations with a minimum of drama.

Many situations requiring a rescue could have been prevented with proper planning. Thorough staff training and attention to detail help to minimize the risk of serious injury during climbing and rappelling activities. Nonetheless, the nature of the program can result in emergencies requiring incident resolution. Almost all incidents can be predetermined by the design of the event and implementation of the program.

Most incidents can be divided into three categories:

- A technical issue, such as a jammed friction device
- A medical issue, such as an injury to a participant
- An emotional issue, such as a scared climber

Your incident resolution plan should address the following:

Technical

- Proper belay technique with a backup belayer has been taught and put into practice.
- Rappel ropes are set up as releasable in order to easily clear a jammed rappel device.
- Event equipment has been set up as appropriate for the activity, and proper instruction has been given in its use.

Medical

- Things to consider that may result in medical issues include bees; loose or slippery rock; poor trail conditions to, from, and at the site; environmental conditions; and food and water.
- Ask participants to relate any medical conditions that they might have. Be aware of any special needs.

Emotional

- Assess whether the participant is physically, mentally, and emotionally ready for the activity or challenge.
- Is the activity age-appropriate for the participant?
- Are there options within the activity to accommodate the varying needs of participants?
- Has the participant been prepared for the activity with skill progressions?
- Has the proper challenge-by-choice environment been established? (There should not be pressure from parents, peers, leaders, or staff forcing the participant into uncomfortable situations.)

In any incident resolution scenario, the preferred outcome is that the participant will be able to continue with the event. In many cases this can be achieved by communicating with and assisting the participant. If continuation is not possible, the next best outcome is that the participant will be lowered to the ground. This may be due to physical or emotional limitations or an injury that has occurred on the event. **The worst-case outcome is that the participant will have to be moved using a pick-off rescue. This outcome occurs only in the rarest of circumstances, and every attempt should be made to avoid a pick-off rescue scenario. Pick-off rescues should be performed only by trained individuals.**

When an incident occurs, it should be evaluated and the following questions asked:

1. What happened?
2. How can it be resolved without causing harm to anyone else?
3. Why did it happen?

All incident resolution plans should avoid a situation that puts additional people at risk or causes further harm to the participant. Rescuers should avoid doing anything that cannot be easily undone.

CALMER Approach

If a situation develops, stay calm and assess it. You will implement the appropriate course of action following this order of rescue:

C—Communicate with the participant.

A—Assist the participant.

L—Lower the participant.

M—Move to the participant.

E—Evaluate.

R—Rehearse.

Communicate

Communication is used in every scenario. In an emotional situation, a climber or rappeller may be frozen on a rock face, tower, or high-course event. Make eye contact if possible. The rescuer should remove mirrored sunglasses so that the participant can see his or her eyes. Communication with eye contact is more personal and reassuring. Talk to the person in a calm voice.

An emotional concern might be remedied by talking the person through the situation using simple, clear, concise, and reassuring words. Ask the participant how he or she feels and what you can do to help. Remember, BSA activities are "challenge by choice," so the participant plays the key role in deciding what to do next. Participants should never be pressured into continuing against their will. If the incident can be resolved with just communication, then the participant will most likely be able to continue.

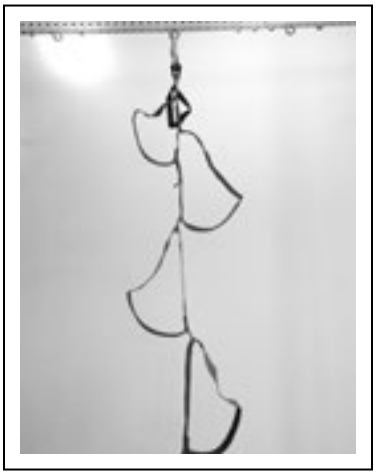
A technical issue may be able to be resolved by the participant. Provide clear directions and allow the participant to resolve the situation.

Assist

Assisting the participant is most often necessary when there is a technical issue. Several simple techniques can be used to help participants get back onto an event, climb past the crux of a route, or free a jammed rappel device. If the incident can be resolved with communication and assistance, the participant will most likely be able to continue with the activity.

Assisting a Participant With a Static or Dynamic Belay Back onto an Event

- An etrier can be placed onto a cable to help a participant regain his or her footing onto an element. The etrier need not be placed on a critical wire, but it can be easier to get back onto the event if the etrier extends up beyond the foot cable. Etriers are typically 5 to 6 feet long, but they can be lengthened with slings as needed, and longer etriers made specifically for incident resolution are available. Etriers may be placed at the incident site by a staff member who comes over from a platform or an etrier with a tagline may be placed onto the wire by a staff member on a platform and then ground staff can drag the etrier to the participant's location.



- A 3:1 jigger pulley system can be used to raise a participant. A jigger system is compact and can be prerigged into a rescue pack. The jigger system will be attached to an upper anchor by the staff, and the lower end of the jigger system will be lowered to the participant who will connect it to his or her harness. The participant can be raised by a haul team on the ground, or if the participant needs to be raised only a few feet the staff on the event may be able to do the raising.

- A tagline may be clipped to the belay wire with a steel carabiner. A ground team can use the tagline to drag a stuck participant to the next pole or platform.

Assisting a Participant With a Dynamic Belay Back onto an Event or Past a Crux

- A dynamic belay line can be used as a vector lift to help a participant back onto an event or to reach the next handhold. The belay rope is grabbed on the participant's side of the belay device. The belay line is pulled perpendicularly to its belay direction. This pull is compounded by the vectoring principle since the rope is at nearly 180 degrees to the force of the pull, which results in the participant being lifted. Vector lifts are very useful when a participant needs to be lifted a short distance. Vector lifts are more efficient when the distance of rope is short as there is less rope stretch to be pulled out.
- A dynamic belay line can be converted to a 3:1 raising system when a participant needs to be hauled a significant distance. Attach a pulley to the line with an ascender or a friction knot several feet in front of the belay device on the participant's side of the rope. The brake side of the rope is passed through the pulley, creating a simple 3:1 raising system. If a self-locking belay device is used, no other capture is needed in the system. If a tubular device or similar belay device is used, then a capture must be put onto the system as the tubular device will be in the open position while the 3:1 system is being used. This is easily accomplished by placing a Prusik knot in front of the belay device on the participant's side of the line. An alternative is to use a jigger system attached to the belay line. This version will allow the belay device to function normally throughout the lift, but an additional anchor may be required for the jigger system.

Assisting a Rappeller With a Jammed Rappel Device

- An extension ladder may be placed against the rappel wall. This can provide easy footing for the participant to take a step up and put some slack into the system so he or she can try to free a jam in the rappel device.
- A participant may self-rescue by placing a Prusik loop above the jammed device. While standing in the loop of the Prusik, the participant can clear the rappel device of the jam. The participant must be cautious when stepping down out of the Prusik loop, making sure to have a hold on the brake rope before the friction device is reweighted. It is recommended that the friction device be locked off after releasing the jam. Then the Prusik can be removed while the participant hangs on the locked-off friction device.

Assisting a Rappeller With a Jammed Rappel Device Who Is on a Single-Line Releasable Rappel With Independent Belay

- Lock off the belay line. Release the releasable rappel line and feed a couple feet of slack to the participant. The participant's weight is now shifted to the belay line and the participant has enough slack to clear the jam in the rappel device. After the participant's rappel device is cleared, lock off the releasable rappel device. Release the belay line and lower the participant until his or her weight is back on the rappel rope. The rappeller may now continue with the activity.

Assisting a Participant With a Double-Line Releasable Rappel

- An extension ladder may be placed against the rappel wall. This can provide easy footing for the participant to take a step up and put some slack into the system so he or she can try to free a jam in the rappel device.

Assisting a Canopy Tour Participant

- If a canopy tour participant fails to reach the end platform, staff may throw a rope to the participant and use that rope to pull him or her to the platform. It also helps if a participant on the end platform weights the zip cable to try to help eliminate some of the uphill angle through which the stranded participant is being pulled.

- If a canopy tour participant fails to reach the end platform, staff may attach themselves to the zip cable with a pulley and tether, and go out to the participant. Access the participant by going down the zip wire using a Prusik from the pulley to the zip line to help manage the position of the staff member resolving the incident. The Prusik also helps the staff member to hold his or her position on a steep part of the zip wire and prevents them from zipping down the line into the participant. When the participant is reached, one of the following methods may be used to tow the participant back to the end platform:
    a. Attach one end of a tow rope to the participant and the other end to the staff member resolving the incident. The staff member then returns to the end platform and pulls the participant back to the end platform using the tow rope.
    b. Attach a tether to the participant and tow him or her back to the end platform.

Note: If the participant's zip pulley has malfunctioned, it may be necessary to swap that pulley for one that is functional. After accessing the participant, the staff member resolving the incident attaches the new zip pulley to the participant with a new tether. Once the new belay system and tether have been secured, the staff member can attach an etrier to the zip line so the participant can remove the tension in order to disconnect the original belay system. If the participant is unable to use the etrier, the staff member will need to use an alternate method to disconnect the belay (e.g., mechanical advantage system).

Lower

Most technical and emotional issues can be resolved by communicating with and assisting the participant. If it is determined that a participant is unable to continue due to either physical exhaustion or a medical condition, the participant needs to be lowered to the ground. This can be easily done using a releasable rappel system or an independent belay line.

Lowering a Participant From a Static Belay

- The participant will have to be removed from his or her original static belay and put onto a dynamic belay system. Staff on the event will build a dynamic belay line on the belay cable from the components in the rescue bag. The dynamic belay system will be walked out to the participant and a ground belay team will be attached to the ground end of the rope. The other end of the line will be hooked to the participant by the staff or the participant. The participant is raised using any of the methods listed above for assisting. Once slack is in the static belay system, the staff or participant will disconnect the static system from the belay cable. The ground team will then lower the participant to the ground once the original belay is removed.

Lowering a Participant With a Dynamic Belay

- Feed slack into the belay device and allow the participant to be lowered to the ground.

Lowering a Participant With a Single-Line Releasable Rappel With Independent Belay

- Unlock the releasable rappel line. Lower both the rappel line and the belay line at the same time until the participant reaches the ground. This can be accomplished by one experienced belayer if belaying from the top but is more easily performed with a second person.

Lowering a Participant With a Double-Line Releasable Rappel

- Unlock the releasable rappel. Lower the participant from the releasable rappel device. This technique requires great skill from the bottom belayer who must maintain the belay by keeping tension on the line while continually working up the rope that is being lowered.

Lowering a Participant From a Canopy Tour/Zip Line

- A canopy tour/zip-line participant may need to be lowered from the middle of an event. Staff will access the participant and construct a dynamic belay system. The belay will be attached to the zip line with a pulley to spread out the load on the zip line. A ground team will be on belay and the other end of the rope will be attached to the participant's harness. The participant may be removed from the static belay either by stepping up onto an etrier or by being raised by mechanical advantage. The ground team will then lower the participant to the ground once the original belay is removed.

In describing the belay system for lowering an individual, many manuals show a rescue eight connected to the belay wire with the rope running through the rescue eight. One end of the rope goes down to the belay team and the other end goes down to the participant. The technique of adding a rescue eight in this application adds extra friction to the belay system. This can be helpful if a second person's weight will be added to the belay system while being lowered. In most cases when lowering a single person, it is preferred to use a shear block or pulley as in any normal belay system. Using the shear block will also give the rescuer the option of raising the participant to take slack off of an old belay system if needed. If using the rescue eight instead of the shear block, there is often too much friction to be able to raise the participant with a vector lift.

Move

As a last resort, a staff member might have to rescue the participant. **A pick-off rescue adds risk to the situation because the participant is being removed from the primary belay system and the rescuer is being put into a dangerous situation. Additionally, these types of rescues take substantial practice for a rescuer to be proficient. Even a skilled rescuer will take several minutes to complete a pick-off rescue.** When designing your camp emergency preparedness plan, every effort should be made to eliminate scenarios that require pick-off rescues. A simple design or operational change in an event may eliminate complex rescues.

Moving a Participant

A pick-off rescue can be broken down into four steps: Access the participant, connect to the participant, remove the participant's original belay, and lower the participant and rescuer.

1. Access to the participant can be made by being lowered or raised. When being lowered or raised, the rescuer can approach the participant hands-free with the attachment carabiner ready to be clipped in. Being raised is the preferred method as the haul team can raise the rescuer and participant while trying to remove the original belay. Typically the rescuer will try to be positioned slightly higher than the participant. This allows the rescuer to use his or her legs to keep the participant from spinning while performing the balance of the rescue.

2. When connecting to the participant, one should always attach to the loop on the participant's harness or the carabiner that is already attached to that loop. The attachment is commonly made with a webbing sling called a pick-off strap. On the rescuer side, the sling may be attached to the hole on the rescue eight, to the loop on the rescue rope, to the carabiner on the loop in the rescue rope, or to the rescue line itself via Prusiks. The pick-off strap is not to be attached to the loop on the

rescuer's harness. An adjustable pick-off strap has the advantage of being able to capture the slack that will be created when taking the participant off of his or her original belay. Rescue companies sell adjustable pick-off straps. Fixed straps can be made adjustable if attached to the rope with Prusiks by sliding the Prusiks up the rope. Prusik connections must be rated for life safety. This will typically involve two Prusiks made of accessory cord or use of a high-strength material for a single Prusik for connection to the participant.

3. Before the participant's original belay can be removed, the rescuer must create slack in the system causing the hang-up. This is commonly achieved by having the participant stand up in an etrier that is attached to his or her rope. The etrier may be hung with a Prusik, but it is faster to connect with an ascender. As the participant steps up, slack will be created in the original system. If using an adjustable pick-off strap, one should capture that slack immediately. If the rescuer was raised to the participant, the haul team can raise both people to create the slack. The participant's original belay can now be unclipped. Caution should be given to make sure the old belay is being unclipped, not the new rescue connection. **Any rescue techniques that involve cutting ropes or other lifeline components shall not be used by COPE/climbing staff. These techniques are dangerous and must be left to rescue professionals.**

4. Finally, commands are given to lower the rescuer and participant together.

COPE and climbing staff should leave complicated rescues to people who are qualified to perform high-angle rescues and are well-practiced in these techniques. National Camping School does not provide this level of training.

Evaluate

After the resolution, debrief the situation with staff members. Were procedures in effect that were overlooked? Would a change in procedure help prevent this situation from happening again?

Rehearse

Once the incident has been evaluated and its resolution determined, procedures might need to be revised. Any changes should be documented and rehearsed by the entire staff so they become familiar with the updated procedures.

Almost all rescues could be avoided with better course design and/or better procedure implementation. Planning, smart setups, and proper preparation could have helped prevent a large percentage of rescues.

Site-specific equipment for possible rescue scenarios must be available at the program site. The type of equipment will be based on what rescue protocols the council committee has established. The rescue bag might be located at the top of a climbing tower as most rescues begin from the top. However, a rescue bag might be stored on the ground of a large COPE course so that it can be moved easily and raised to the platform where needed.

In many cases, it is possible to have items in the rescue bag prerigged so they are easy to use, such as a raising system. In the case of a releasable rappel line, the rescue equipment is always hooked up and ready for use.

A typical rescue bag might include:

- Rope: When used to belay two people, a rope must be rated for a two-person load. Rope length should be at least twice the height of the event. Having rope that is a different color from other ropes in the program makes it easy to identify during a rescue scenario.
- Several slings
- Lobster claws
- Pliers
- Double-sheave pulleys
- Extra webbing
- Friction device
- Locking carabiners
- Single-sheave pulleys
- Extension ladder
- Etrier
- Ascender
- Pick-off strap
- Prusik cords
- Shears
- Leather gloves
- Taglines

Rescue Practice

No participant or instructor should be put in a practice scenario that is dangerous or could become an emergency situation. Practicing these techniques should take place a few feet off the ground. Many accidents have occurred throughout the world when instructors attempted to practice incident resolutions that went beyond their level of training.

Incident resolution scenarios can introduce instructors to a variety of incidents and problem-solving situations. Here are some pointers for conducting successful incident resolution scenarios:

- Encourage instructors to consider a variety of solutions such as talking a participant down, using a belay to lower a participant to safety, or ascending to the participant.
- Take into account all the resources at hand for use in an assist—for example, rope and hardware for a second belay system, a pulley system, or an extension ladder. Other resources may include the option of calling in a fire department or search-and-rescue unit.
- In practice, as in real emergencies, ensure the safety of everyone involved. Stop a practice session if you observe unsafe procedures. Check the people involved in the scenario often to be sure they are comfortable and not in any danger, especially if they are suspended on the climbing face.
- Make the scenarios as realistic as possible. Those involved should model the behaviors that might be expected in a real emergency situation.
- Evaluate the practice for the following:
  - Was it effective? Was the person safely returned to the ground? Was appropriate first aid provided in the correct sequence?
  - Was it safe? Did the staff monitor their own security and that of others? Was the technique appropriate for the incident? Could there have been an easier technique?
  - Was the assistance prompt? Without jeopardizing safety, how could it have been done more quickly?
  - Was it sufficiently simple and well-considered?
  - Was it organized? Did everyone involved know what was going to happen?

Finally, instructors should give serious consideration to what they would do differently the next time they are confronted with a mock or real emergency.

CHAPTER 14

Universal Access

Universal access means enabling all people to reach every destination. In a COPE or climbing program, this allows people with special needs to participate in any activity by providing accommodations or alterations of program or facility.

Concentrating on each person's abilities rather than disabilities increases the options for using the program for people with special needs. It is important for facilitators to ask empowering questions:

- How do you think you can participate in this challenge?
- What would you like to do?

Work with participants to make their goals possible rather than make assumptions about their limitations. The activity plan should focus on the entire team's strengths and allow them to work together to accomplish their goals.

Not all special needs accommodations require expensive facilities or equipment; some may be as simple as adjusting stories and activity scenarios to allow participation. Examples might include:

- Planning a blind trust walk course in an area that provides wheelchair access, such as parking lots or paved trails
- Integrating spotting techniques that use touch rather than vision for blind participants
- Adjusting difficulty level to accommodate more limited cognitive abilities of people with developmental challenges
- Having participants who use wheelchairs provide balance from the ground for participants on activities such as Whale Watch or Mohawk Walk

UNIVERSAL ACCESS PLANS

When councils implement universal access programs, they must create a plan that includes the following:

- Program goals: The goals for the program must be clearly stated so that all staff members understand them and can work toward accomplishing them.
- Staffing and support policies: These policies should consider the following:
  - Staffing to participant ratios may need to be adjusted for universal access programs.
  - Planning with caregivers prior to program implementation should be required. These plans should include desired outcomes as well as plans for participant safety (e.g., spotting methods, belay techniques, use of appropriate personal protective equipment). In some cases, individual participant plans will be needed.
  - Caregivers should be present at the program site to provide additional participant safety and well-being.
  - As is true with all programs, post-program evaluation with participants and/or caregivers should be part of any universal access program. The results of these evaluations should be used by the council COPE and climbing committee for program improvement.

UNIVERSAL ACCESS FACILITIES AND EQUIPMENT

Flexibility can be built into the design of certain COPE course elements so that facilitators can easily alter the challenge level. Examples include the following:

- The Porthole suspension system can be designed so that the tire can be lowered or raised by the facilitator. Having multiple tires available that can be easily attached to the suspension system to vary the size of the pass-through opening adds even more flexibility.
- The Spiderweb can be designed so that webs with larger openings can be easily installed on the support structure.
- The Whale Watch platform can be made larger or designed to allow wheelchair access by adding trim to prevent wheelchairs from rolling off the platform.
- The Beam and Water Wheel can be designed with support structures that allow height adjustment of those elements.
- Climbing holds can be adjusted to provide routes that allow participants to climb with limited use of their legs.
- A counterweight system can be used by people with varying degrees of strength to access high elements. A weighted pulley system attached to the climber may provide the lift needed to reach the element. As the climber ascends, the weight slowly descends. The amount of weight on the counterbalance can be adjusted to create an appropriate level of challenge. For instance, a person with some degree of upper-body strength but no leg support can climb with a percentage of body weight on the pulley system.

While it is easier to provide universal access by designing it into new facilities, it may be possible to modify existing facilities to provide universal access. There are several professional challenge course builders that have considerable experience designing and constructing facilities and modifying existing ones to provide universal access. Councils should consult with these experts before implementing universal access programs. It is important to research these companies and check with those who have had experience with the companies before making any commitments. Providing universal access programs adds to the

COPE or climbing/rappelling program, and it is very important that these programs be designed and implemented properly.

Some facilities are not designed to provide universal access. Before attempting to use any facilities for special needs programming, a hazard analysis should be performed. Some elements or activities might be excluded from the universal access program plan.

There are some high COPE elements or climbing activities that can be easily adapted for universal access. An example might be a cable traverse where the participant can access the element by being lifted with a pulley system to an elevation where he or she can use the foot cable to traverse the element and then be lowered with a pulley system at the other end of the element. The following requirements should be followed:

- The participant must be on belay at all times using an appropriate harness and belay system that is separate from the lifting system.
- The lift system should use a progress capture method that can be released in order to lower the participant.
- A safety tether should be used to secure the participant once the ascent is complete and during traversing. The tether must be able to be released to allow lowering.

The photo at right shows a simple pulley system used to lift a person with limited use of his legs. The participant is using an ascender to grip the rope and lift himself up to the element. The independent belay provides two functions: fall protection for the participant and progress capture for the lifting system.

In summary, universal access systems can add richness to a council's COPE and climbing/rappelling programs by allowing additional populations of people to participate in the Scouting program. Councils deciding to add universal access to their programs should carefully consider their goals and develop sound plans prior to implementation. These plans should include detailed analysis of program facilities, equipment, procedures, and risk management implications. Staff members who facilitate these programs must be properly trained in the council policies and procedures as well as the techniques used in providing universal access.

CHAPTER 15

Course Construction Fundamentals

SITE SELECTION

Many factors are important when selecting a location for a new COPE course. Each event must be held in an appropriate setting, taking into account the impact the course will have on the environment and on future camp developments. For these and other reasons, make sure that a COPE and Climbing program manager, a camp ranger, an arborist, and members of the COPE and Climbing, camping, and properties committees are involved in all phases of choosing the site.

COPE course sizes vary greatly depending on the terrain, available space, and the number of events. In general, a large field should be set aside for warm-ups and games, and each COPE element will require a space equal to a circle with a radius of approximately 30 feet. Some activities, particularly high-course elements, may need more room. Allow enough separation to ensure that elements for one event will not be visible from another event.

COPE courses can often be placed on land that does not lend itself to other developments. Use of natural contours or features can add to the beauty, intrigue, and challenge of some COPE elements. However, an area that may be needed later for intensive developments, such as family camping, should be passed over in favor of property that you expect to be less in demand.

Basic environmental considerations will also come into play. Power lines, vehicular traffic, and ridges exposed to gusts of wind or lightning should be avoided. Ecologically fragile areas such as wetlands, stream banks, and locations critical for wildlife should also be ruled out.

Different factors involved in choosing a site may be weighed according to their relative importance. Among these, be sure to consider:

- The course should be situated where it will receive maximum use throughout as much of the year as possible.
- A well-designed trail system must be planned to connect events and to give participants convenient access to and from the COPE course.
- The area must be accessible to construction equipment as well as service and emergency vehicles.
- The area should be large enough to allow good visual and audio screening between events.
- Soil and vegetation should be sturdy enough to withstand heavy use.
- The course should be set apart from other camp activities, but placed where it can be monitored or where access can be controlled.

COPE events should be designed in a way that prevents unauthorized use. This may be accomplished by fencing off elements that are in high-traffic areas, by placing the course in a remote area of the camp, or by constructing the elements so they can be disabled when not in use. Low course elements can be disabled by locking moving parts to a nearby pole or by using turnbuckles to make them inoperable. High course elements should be disabled to a height of 12 feet. Signs must be posted to warn that the program area can only be used under qualified supervision.

PARTS COMMONLY USED IN COURSE CONSTRUCTION

Thimble eyebolt (TEB)—Developed to carry straight loads in trees or on poles, the TEB has a contoured head that provides shear reduction for the cable loop and prevents a cable running through it from kinking, bending, or spreading.

Angled thimble eyebolt (ATEB)—An ATEB is the same as a TEB but the head is bent to 45 degrees. It is designed with an angled eye to carry the weight of loads pulling downward from an anchor point at a 45-degree angle. This eyebolt is a good choice for attaching guy cables to poles or trees.

Nut eyebolt—This bolt has a round eye opening on the head end of the bolt. Placed all the way through a tree or pole, the nut eyebolt provides a dependable anchor for a belay or element connector.

Machine bolt—Machine bolts have many uses on COPE courses, including fastening together beams for low-course events and securing the components of platforms.

Round washer—This basic or oversized washer is used on many of the bolts incorporated in COPE course structures.

Fishplate—If a round washer is not large enough, the 2¼×2¼-inch fishplate may be just right.

Tunaplate—The 4x4-inch tunaplate washer fills in where fishplates are too small.

Curved square washer—The slight curve of this 2¼×2¼-inch washer fits against the contour of a power pole.

Double-coil lock washer—This galvanized, 5/8-inch coiled washer ensures the tightness of a nut installed on a utility pole or on lumber. It is not necessary for installing bolts through trees.

Ferrules—The metal ferrules pictured here are installed with a swaging tool to join two pieces of cable. Only copper ferrules are allowed in critical applications, and zinc-plated copper (left) is preferred. Follow the manufacturer's

recommendations for the number of crimps required on each ferrule, which will be determined by the surface area of the swaging tool. Aluminum ferrules (right) may be used in noncritical applications. Duplex ferrules are used for joining together two pieces of cable. Button ferrules are designed for use on a single piece of cable.

Serving sleeve—The metal serving sleeve fits over the end of a clamped cable to prevent the cable wires from fraying. A serving sleeve should be used wherever the cable end might be touched by the hand or foot of a participant.

Fist grip—Fist grips are clamps used to join together two sections of cable without damaging them. A fist grip reduces the amount of stress on a cable, which makes it a good choice for cables that must be adjusted periodically.

Wire rope grip—These drop-forged, galvanized U-bolt clamps, also called wire rope clamps, securely fasten together two pieces of cable.They should not be confused with the less expensive malleable type of clamp—which is not acceptable for use on COPE courses. Always follow the

manufacturer's recommendations. A minimum of two cable clamps is required for 3/8-inch 7×19 GAC (galvanized aircraft cable).

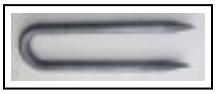
Strandvise®—
This product of the MacLean-Fogg Company is a strong, easily installed end-connection for cables. A Strandvise must be backed up to prevent the cable from accidently slipping.

Shoulder lag eye screw—This galvanized, forged, threaded eye screw can be used as an anchor that does not support a person's weight.

Lag screw—This ½-inch hex-headed screw is used for connecting sections of lumber for platforms or attaching horizontal wall supports to tree trunks or utility poles.

Turnbuckles—As connectors between cables and anchors, turnbuckles make it easy to set up, tighten, and dismantle many COPE course events.

Staples—Staples used on COPE courses come in a variety of sizes: 3/8-inch diameter staples are used for light attachments such as a "spider's web" or a maze, or to keep loops from drooping; ½-inch diameter staples come in 6-inch and 8-inch lengths, and can be used for a staple climb on a tree or a pole. Staples must not be used in place of through bolts to secure belay, foot, or activity cables.



Rapid links—These are strong, inexpensive connectors with specific uses in setting up COPE course elements.

Thimbles—Thimbles are used to shield from abrasion the inside of an eye formed in a rope or cable. For cable, use the same size thimble as cable size (find the dimension stamped inside each thimble). For rope, use a thimble one size smaller than the rope's diameter. Keep in mind that there are heavy-duty and light-duty thimbles. The heavy-duty type has thicker walls and works better on challenge courses. Light-duty thimbles will lose their form under tension.

Cable drop plate—The cable drop allows a vertical swing rope to be fixed at a point on a horizontal cable.

Guy wire anchor— This anchor is screwed into the ground until only the head of the anchor is visible.The head is designed for attaching the guy wire cable.

ELEMENT SUPPORT STRUCTURES

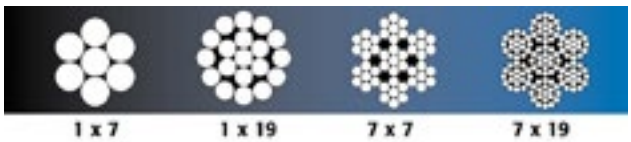
COPE courses are commonly supported on trees or poles. Trees offer shade and may not need guy wires, but they need to be periodically inspected to ensure they are living and solid root structures. Trees used on a COPE course typically need to be at least 8 inches in diameter at the point of attachment.

Utility poles can be used for COPE courses. The poles are durable and can be placed exactly where they are needed. As with trees, periodic inspections are important to determine any changes in the condition of the poles. BSA standards require that critical applications use class 1 or class 2 poles. They should be new when installed and set to a depth of 2 feet plus 10 percent of the length of the pole. Attachments cannot be made within the top 12 inches of the pole. Steel and concrete poles can be used instead of typical wooden poles. An engineer should be consulted to help size the poles for meeting the expected loads.

COPE courses and artificial vertical climbing structures can be installed on the beams and columns of an existing structure—but make sure to consult an engineer when designing the connections.

CABLE TERMINATIONS

The most common type of cable used for a COPE course is 3/8-inch 7x19 galvanized aircraft cable. Also called wire rope, this cable has the flexibility needed to serve as a foot, hand, or belay line for a COPE or climbing program. Cables with less flexibility—such as 1×7, 7×7, or 1×19—may be used as guy wires. Make sure to only use fittings that are designed specifically for the type of cable you are using. Wire rope clips are not permitted on 1×7 or 1×19 wire rope. All cables used must be corrosion resistant. Galvanized cable is most common, but stainless steel wire rope may be appropriate in certain situations (e.g., when the course site is near salt water).



The breaking strength of 3/8-inch galvanized aircraft cable is 14,400 pounds. The cable strength is reduced when a termination is made, similar to what happens to the strength of a rope when you tie a knot. The accepted reduction for terminations is 20 percent: 14,400 × .80 = 11,520, which is commonly rounded to 11,500 pounds. This means that all connectors and bolts used in cable termination of 3/8-inch galvanized aircraft cable must be rated to 11,500 pounds. Likewise, terminations with any other type of cable must have connectors and bolts rated to 80 percent of that cable's breaking strength.

There are three types of industry standard connectors for cable terminations:

Wire rope clips (cable clamps)—These must be forged and corrosion resistant with the proper number of clamps (a minimum of two). The clamps must be torqued, spaced, and properly sized for the cable being used. Do not use the malleable versions of cable clamps sold at hardware stores, which are inappropriate for COPE and climbing programs.

Strandvise®—Use only the 5200 series for 3/8-inch 7x9 cable. Refer to the Association for Challenge Course Technology (ACCT) website at www.acctinfo.org for an advisory on Strandvise usage.

Ferrules—Use only copper or zinc-coated copper ferrules for critical connections. Aluminum ferrules may be used in noncritical applications. Follow the manufacturer's recommendation on the number of swages per ferrule. Ferrule crimps should be checked with a swage gauge for appropriate depth.

Alternative connections may be used if they are corrosion resistant and rated to at least 80 percent of the strength of the cable.

Cable terminations are typically attached to the support structure with a bolt (see bolt types above). All through-bolt terminations must be backed up with a system rated at 80 percent of the primary wire rope strength. These backups are configured to protect against bolt or termination failure, not wire rope failure. Additionally, the nut on the bolt must be backed up. This can be done with a double nut, lock nut, or a double-coil lock washer.

A pole wrap is a common cable termination in which a loop of cable is passed around the support structure. In a pole wrap, there is no bolt to back up. A third wire rope clip or second ferrule is added in this case, and a staple or shoulder lag eye screw should be used to keep the cable loop at the proper elevation.

Refer to the appendix of the ACCT manual for pictures of many types of approved cable terminations with backups.

CRITICAL VERSUS NONCRITICAL APPLICATIONS

The construction of a BSA COPE course must follow the ACCT challenge course standards. The termination—the way that the rope or cable is attached to the pole or the tree—will belong to one of two categories: critical applications or noncritical applications. Critical applications must have a backup. To ensure high standards, it is recommended that councils select a qualified professional

challenge course builder to construct the elements.

To determine whether a connection is critical or noncritical, ask yourself: Could a serious injury result if the connection were to fail? Critical applications are generally defined as those in which there would be serious consequences for participants, staff members, or observers if the connection failed.

Examples of applications that are always considered critical:

- Belay cables
- Zip lines
- Suspension systems for large or heavy objects
- Guy cables, if a failure would result in the element cable dropping to a level that puts the participant in danger

Examples of applications that are considered noncritical:

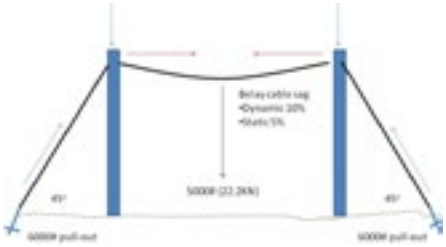
- Low element foot or swing cables
- Suspension cables for lightweight objects, regardless of elevation—hand lines, trapeze bars, swing cables, etc.

FORCES IN CHALLENGE COURSE BELAY SYSTEMS

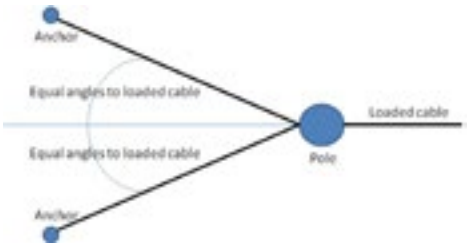
A belay cable, less the loss in strength for the terminations, is rated at 11,500 pounds. When reduced by a 5:1 safety factor, this leaves a working load of 2,300 pounds.

ACCT defines a load from a person to be 500 pounds. A belay team imposes twice that load: 500 for the belayer and 500 for the participant, or 1,000 pounds. Therefore—since 1,000 goes into 2,300 only two times—a team on a belay cable must be limited to two people.

The angle is an essential factor in attaching a cable to a pole, just as it is when setting up an anchor at a rock site. A belay cable should not be tightly stretched between two poles; instead, when a cable is properly installed, it has a drape to keep the forces within the load limits of the system. On a top rope belay, the amount of installation drape should be equal to 10 percent of the span of the event. If the event is belayed with a static system, the drape can be reduced to 5 percent; this is because the half of the load that would be generated by the belayer is not present.



Utility poles are extremely strong in compression, meaning that they can hold a tremendous vertical load on top of the pole. However, the belay wire applies a load to the side of the pole, which could easily pull a pole over. For this reason, guy wires must be added to convert the side load from the belay wire into a compression load on the pole. Guy wires must be at a 45 degree angle to the pole and within 12 feet of the cable they support. If the guy wires are supporting a cable that might have a swinging load, you should install two guy wires per side. This gives the pole stability to prevent it from leaning back and forth as the load swings. Guy wires should be installed to have a pull-out strength of 6,000 pounds.



TOOLS USED IN COURSE CONSTRUCTION

Builders working with the cables, ropes, and bolts of a COPE course will encounter certain tools and hardware not always found on general construction sites. Among the most useful are the following:

Cable cutter—A quality cable cutter will cleanly sever a cable so that it can be used with cable fittings. For COPE course construction, select one made to cut 3/8-inch 7x19 aircraft cable. The cutter can be manual or hydraulic.

Swaging tool—The swaging tool joins two pieces of cable by compressing a ferrule onto them.

Chain puller—A chain puller is used to tighten cables. A cable ratchet winch can also be used for this purpose. No more than one ton is necessary for most applications.

Havens® grip—This product manufactured by Klein Tools is a camming device used to secure a cable or rope to a second cable. The Havens grip is often used along with a chain puller or ratchet winch to tighten a cable.

Strandvise® hook—This hook-shaped dead-end puller tightens a cable running through a Strandvise.

Power auger—You must use a power auger with an 11/16-inch bit if course construction requires drilling holes through trees or treated poles.

Torque wrench—This tool is necessary to tighten wire rope clips to the specific torque.

Specialty wrenches—Lineman's wrenches are made to fit square nuts for 5/8-inch and ¾-inch pole hardware. These wrenches are available in ratcheting version as well.

Guy grip—Designed to grab the top of a guy wire shaft under the head, this dead-end puller can tighten a cable running to a guy anchor.

COURSE AND EQUIPMENT MAINTENANCE

There are many items on the COPE course or climbing structures that should be inspected on a regular basis. Performing basic maintenance can save time and money. Here are some common items that require attention:

Trails—Grade trails to allow for proper drainage. Spread wood chips to prevent soil compaction. Cut back brush just enough to allow for safe passage, and remove fallen or dead branches.

Fields—Keep the grass cut, and fill in any low spots that might lead to a twisted ankle.

Hardware—Inspect all belay and rappel devices before each use. Retire any that have a sharp edge to prevent wear on your ropes. Careless climbers often wear figure-eight rappel devices after retrieving the device from the bottom of the rappel. Do not pull the device back up the rappel route, as it will be scarred by the rock. Instead, walk the device back to the top or make sure each person has his or her own device.

Carabiners—Lubricate any sticky gates.

Ropes and webbing—Dirty rope or webbing should be washed to remove grime and rock crystals that could shorten their useful life. Wash the items in a mesh bag with warm water and mild soap, either by hand or in a front-loading machine that has no agitator to entangle the rope. A commercial rope washer may also be used with a soap made specifically for that purpose. Rinse the rope well and air-dry it away from direct sunlight before storing or using it again. Complete drying may take several days. Do not dry rope or webbing in a dryer or expose them to excessive heat, bleach, or other chemicals. Do not lay them on a garage floor to dry, as there may be remnants of car battery acid on the floor.

Harnesses—Use a hot knife or rope cutter to cut back a frayed webbing end.

Helmets—Wash helmets with a diluted automotive cleaner. Rinse thoroughly.

Ladders—Lubricate moving parts to assure proper function.

Wooden structures/platforms—Drive in exposed nails or screws. Replace worn or weak boards.

Bolts—Bolts may become covered as trees grow. If this happens, replace the bolts or have a professional vendor do the job. Bolts can be loosened as lumber and poles age, so make sure to tighten them each year.

Cable—Replace discolored or scaled cable or have a professional vendor do it.

Multiline activity/hand ropes—Ultraviolet rays age all ropes. Remove and store multiline ropes during the off-season. Replace when worn.

Rapid links—Also called quick links, are used in a variety of ways on courses. They are usually only zinc-plated. Replace them when they show signs of corrosion.

PART TWO

COPE

CHAPTER 16

Goals and Features of COPE

Challenging Outdoor Personal Experience (COPE) is one of the programs of the Boy Scouts of America. COPE was launched in 1983. The program comprises group initiative games, trust events, low-course events, and high-course events. Some activities involve a group challenge, while others develop individual skills and agility. Participants climb, swing, balance, jump, rappel, and devise solutions to a variety of problems. Most participants achieve much more than they imagined they could.

COPE is designed to meet the needs of people of all ages who are seeking ways to challenge and expand their physical and mental abilities. As a noncompetitive program, COPE permits every participant to succeed. The group activities are ideal for enhancing the leadership and teamwork of Scout units, and activities that challenge individuals can be used to promote self-efficacy and personal growth.

GOALS AND OBJECTIVES OF COPE

The COPE program is designed to enhance the Scouting experience and to promote Scouting values and objectives among its participants with fun and challenging activities. While each COPE course is unique and each person who experiences it has individual objectives, the COPE program emphasizes eight major goals.

Communication

COPE encourages communication among individuals in the group to help achieve goals. The challenges presented by the COPE experience often provide opportunities to sharpen communication skills and adapt communication to fit unusual situations.

Planning

COPE participants are encouraged to consider and/or develop goals for each activity and options for achieving those goals. The group then utilizes its collective knowledge and skills to design and carry out a course of action. Nontraditional solutions that are "outside the box" may be appropriate.

Teamwork

The COPE experience makes it clear that each individual can accomplish more as a member of a team than by going it alone. The sense of belonging to the group is one of the most powerful potential outcomes from participating in COPE.

Trust

Participants completing difficult tasks on a COPE course often develop trust in themselves and their team. For some, trust comes easily, and for others, extending trust and letting go of control is more difficult.

Leadership

Some individuals are naturally gifted with leadership qualities while others have to develop those qualities. Participants who may not normally take a leadership role will have opportunities to take on more responsibility and leadership. Similarly, those who easily take charge will have opportunities to learn when it may be appropriate to step back and follow someone else's lead.

Decision Making

COPE encourages groups to make decisions by developing one or more solutions to a problem. Group members consider the available resources and alternatives, evaluate the probable results, and adjust their plans accordingly.

Problem Solving

COPE challenges groups and individuals to develop solutions to interesting problems. Participants can then test their solutions and evaluate the results as they process the experience with the help of a trained facilitator.

Self-Esteem

Participation in the COPE program provides opportunities for individuals and groups to develop confidence in their ability to meet challenges. The COPE program, like other outdoor programs of the Boy Scouts of America, provides opportunities to develop self-esteem in a safe and positive environment.

BACKGROUND AND HISTORY OF ROPES COURSES

COPE is one of many ropes course programs throughout the world. Ropes courses are the core of adventure programs that use physical and mental challenges to promote the experiential learning of leadership, self-confidence, and other life skills. Scouting has a rich history of this kind of adventure learning; the COPE program adds scope and flexibility in a safe, time-tested format.

- 1920

A German named Kurt Hahn establishes an outdoor program called Salem School. Hahn built his program on principles of personal responsibility, kindness, and justice toward developing the fitness and confidence of participants.

- 1933

Hahn calls upon his fellow Germans to resist Nazism in favor of a more just social order. He is imprisoned, and then exiled to Great Britain.

- 1934

Hahn opens the Gordonstown School, featuring the motto "You've got more you than you think!"

- 1940

Many well-trained but inexperienced young men perish during the Battle of the Atlantic, while a number of older men survive by virtue of their sense of wind and weather, self-reliance, and a selfless bond with others.

- 1941

Hahn founds the Aberdovey School and establishes the Outward Bound program to train people for survival skills by using the challenges of the sea and mountains. The program includes rescue techniques and service to people. Its motto is "Training through the body, not of the body."

- 1950s

Hahn's Outward Bound concept spreads to Germany, Australia, Nigeria, Kenya, and the United States.

- 1952

Josh Miner, an instructor from the Aberdovey School, institutes "the Break" at Phillips Academy in Massachusetts. The Break, a physical education program, stresses personal improvement rather than competition.

- 1960s

Outward Bound schools proliferate, including affiliate programs offering opportunities to urban youth. Outward Bound ropes courses are used to recreate challenges in a controlled environment.

- 1970

Project Adventure begins as a curricular program in Massachusetts, using a ropes course and other challenges as teaching tools.

- 1975

Scouts experience the ropes course at NORJAM, the 14th World Scout Jamboree in Norway.

- 1981

Scout councils begin to build challenge courses. Pony Express Council builds the "Challenging Outdoor Physical Encounter" course at the council's Camp Geiger.

- 1983

The National Council makes COPE part of the BSA camping program and offers training through the National Camping School. The acronym COPE eventually comes to mean Challenging Outdoor Personal Experience to emphasize the importance of dealing with cognitive challenges.

- 1990s

Challenge courses and COPE continue to grow in popularity and utility, providing recreation and training for youth groups, corporate leaders, and others. The BSA adopts the installation standards of the Association for Challenge Course Technology.

- 2000 to 2012

COPE changes and grows as the field of adventure programming advances. Professional organizations, including ACCT, ensure safe and successful challenge course programs. National Camping School literature includes information on universal access so that elements can be used by people with disabilities.

- 2013

The BSA adopts the operations and training standards of the ACCT. New standards and program changes, as part of the National Camp Accreditation Program (NCAP), continue to be developed to maintain the quality of COPE programs.

CATEGORIES OF COPE ACTIVITIES

A COPE experience can include initiative games, trust events, low-course events, and high-course events.

- Initiative Games

Initiative games at the beginning of each COPE session help participants learn to work together through communication to achieve their goals. Initiative games do not require constructed elements. Many initiative games require only simple props or no props at all.

- Trust Events

Trust events are a series of activities designed to develop trust in the mind of the individual and with the group as a whole, as well as to develop spotting skills.

- Low-Course Events

Low-course events do not require participants to be on a life safety system. While individual coordination and strength are helpful, participants accomplish the low-course activities with the support and combined efforts of the group.

- High-Course Events

A COPE activity is considered a high-course event when participants are required to be on a life safety system. Some high-course events tend to focus on individual initiative rather than group problem solving, depending on the design of the program. Creative high-course program designers have incorporated team challenges into high-course events, such as couples climbing the Giant's Ladder. Group support and belay teams also provide teamwork opportunities.

FEATURES OF COPE

Among the features that make COPE interesting and challenging to a variety of participants are the following:

- Noncompetitive

COPE activities emphasize the importance of working together without creating the "winner–loser" situation found in most team sports.

- Nontraditional

People with underdeveloped coordination or strength can be discouraged by traditional sports and games, while experienced athletes might be overconfident in their physical abilities. COPE encourages the involvement of all team members in all COPE activities and events.

- Risk Taking

The actual risk of a properly conducted COPE program is lower than in traditional sports programs, but the perceived risk can be very high. Facing this type of risk helps participants build self-confidence and trust.

- Process vs. Performance

COPE experiences emphasize the process of decision making and problem solving, and how outcomes can be affected. This process helps participants develop and reinforce skills needed to solve problems in the real world.

- Self-Discovery

COPE encourages spontaneity, creativity, and exploration. COPE activities and events teach participants to challenge themselves while having fun in a responsible manner. COPE experiences allow group members to interact without being restricted by preconceived notions of behavior.

- Acceptance of Responsibility

COPE participants are never coerced into doing any activity. Participants may be encouraged to take part, but COPE staff members, group leaders, and other participants respect the right of each individual to refrain from taking part in any or all activities or events. **It is important to remember that there can be a fine line between encouragement and coercion!**

- Adaptable

By varying the goal or adjusting the situation, most COPE activities and events can be customized to challenge each team and each participant at an appropriate level.

LEVELS OF THE COPE PROGRAM

COPE activities and events are designed for Boy Scouts ages 13 and older, Varsity Scouts, and Venturers. Based on their maturity and physical coordination, 11- and 12-year-old youth may take part in initiative games and some low-course and high-course events at the discretion of the COPE director or COPE Level II instructor.

GUIDELINES FOR USING COPE PROGRAMS

COPE programs are designed for members of the Boy Scouts of America; however, other groups, such as adults or youth from non-BSA groups, may use the course according to current COPE and climbing standards and the operating policies of local councils.

COPE programs can be improved by serving other organizations and collaborating with other BSA program committees or external organizations in developing innovative alternative programs.

CHAPTER 17

Sequencing and Processing

Sequencing is the arrangement of activities and their level of difficulty. Facilitators must take into account several factors when selecting the games or activities for a particular group. Factors to consider are:

- Goals of the group
- Physical ability of the participants
- Group morale and cohesion

Effective *processing,* or reflection, is the most critical element of the overall COPE experience. Through effective processing, the facilitator is able to draw comparisons between individual and team performance and the correlation between the challenges the individual and group faced and the challenges that the participants face in their everyday life. It is important to remember that not every element or activity requires processing. However, facilitators should be sensitive to opportunities for a "teachable moment."

TECHNIQUES FOR EFFECTIVE PROCESSING/REFLECTION

- **Physical arrangement.** Sitting or standing in a circle gives everyone the same relative place in the group. A facilitator might choose to use a semicircle facing the completed element in order to focus the group's attention on what they just accomplished. Standing in two rows facing each other may be useful to promote communication using dyads.
- **Open-ended questions.** Ask participants questions that require them to think and respond with more than one word.
- **Time.** Allow the group to discuss the issues and objectives of the activity. Keep it upbeat, and do not allow put-downs. Keep the discussion moving, and do not dwell on small issues.
- **Objectives.** Ask questions like: "What do you think the group did to attain the objectives of the activity?" or "How do you think the group could have accomplished the objectives of the activity better?" Ask questions in a way that allows the group to determine whether their goals were met.

Examples of effective processing techniques and reflective questions include:

- What were the rules for this activity?
- What was the goal of this activity?
- How did you accomplish the task?
- Knowing what you know now, what would you do differently?
- What were the key elements that led to your success (or failure) in this activity?
- How do you feel about the overall group performance?
- How can you apply what you learned to your everyday life?

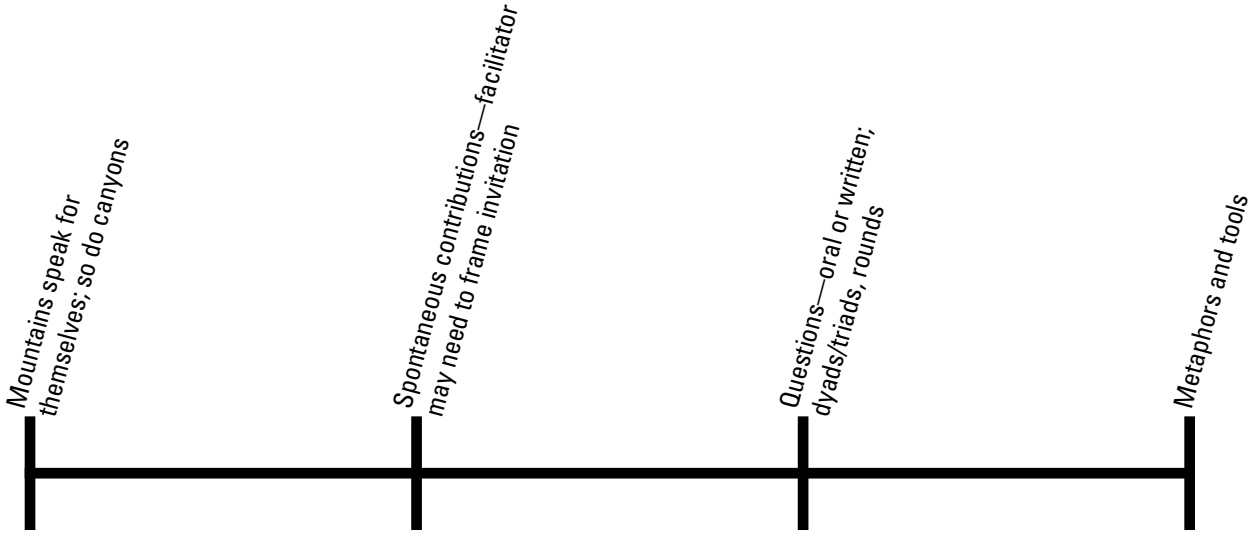
Facilitators must find the way that works for them. The focus of processing is to get the group members communicating with each other. This may take a lot of intervention and prompting from the facilitator, or it may flow naturally. There are many techniques and tools to help make processing more effective. The following diagram oversimplifies the facilitation process but can be of value to help understand how to move the group members from relying on the facilitator to promote communication to doing it for themselves.

The processing techniques at the right are very dependent on facilitator involvement. The statements at the left remind us that there are times when communication has already happened and the experience speaks for itself, whether it is a high or a low. Here, the facilitator must decide if more words will help or hinder the group experience.

Good facilitation and processing are as much art as they are mastery of skills. Good facilitators are always looking for new techniques, and seek out experiences that help them to develop their art and craft. There are many great resources that may be of value in developing processing skills. Here are just a few:

- *The Complete Ropes Course Manual* by Karl Rohnke, Don Rogers, Jim B. Wall, and Catherine M. Tait (Kendall-Hunt Publishing Co., 2012).
- *Processing the Experience* by John L. Luckner and Reldan S. Nadler (Kendall-Hunt Publishing Co., 1997).
- *A Teachable Moment* by Jim Cain, Michelle Cummings, and Jennifer Stanchfield (Kendall-Hunt Publishing Co., 2008).
- *Tips & Tools: The Art of Experiential Group Facilitation* by Jennifer Stanchfield (Wood 'N' Barnes Publishing Co., 2008).

Processing Continuum



CHAPTER 18:

Stories and Tall Tales

Great facilitators know that the difference between a mediocre day on the course and an amazing day on the course is the ability to fully engage the audience. There are many techniques that can command your audience's attention such as making eye contact and energetically delivering instructions. However, your goal should not be to command and contrive predetermined results; instead, strive to stimulate the participants' own thought processes. The skillful use of stories and tall tales is an excellent way to increase the fun factor while fully engaging your participants. Without the story, the challenge course is just a bunch of cables and boards.

To weave successful stories into your challenge course program, consider these tips:

- **Plan from the audience's perspective**—To successfully work with a group, you must know basic demographics such as age and gender. More importantly, you need to understand the group's interests and basic needs. This understanding will allow you to tailor each program and story to the audience and generate an enthusiasm that will enhance learning through the use of familiar topics. Do not choose storylines that may offend or confuse your audience.
- **Determine your end goal**—A facilitator should always communicate with a group prior to its arrival to determine what the group's goals are for the day. This knowledge will allow you to create stories and anecdotes that provide structure and purpose for activities.
- **Develop your story by focusing on the takeaway**—Every story plot has a beginning, middle, and end. Yet the end of a story is what participants will remember, so make sure everything builds toward a clear end message.
- **Create a great story**—When developing the plot for your story, remember that your goal is to engage your audience's imagination and create vivid images in their minds. Like all good stories, start with who, what, when, and where, but take these simple facts and make them interesting by adding details and human context. Don't paint yourself into a corner with your story. Leave room for more of the adventure to unfold as the activity progresses. You never know what will happen, and you might need that flexibility later on.

- **Goals and obstacles**—Once you have set the scene for your story and described the plight of your protagonist, immerse your group in the plot by describing the obstacles and either asking for their assistance or assigning their mission. Weave challenges and changes into the story. It is important that the facilitator is not viewed by the group as an adversary, which can easily happen when the facilitator imposes seemingly arbitrary rules or penalties as the activity progresses. The benefit that often comes from changing things during the activity is enhanced by weaving the new conditions into the story rather than just imposing new rules or adding additional penalties.
- **Process well**—Most good stories end with a description of how the goal might be attained. Be sure to ask thoughtful questions that promote sharing and discussion about what happened and what the individuals and group take away from the experience. The processing experience can often be enhanced when members of the group relate what happened from their perspective. This can result in significant sharing about who did what when.
- General comments:
  - Maintain good eye contact.
  - Enunciate—Speak slowly, loudly, and clearly.
  - Use your body language to convey energy and enthusiasm. For example, a gesture that opens and reaches out to audience members will make them feel more involved in the story.
  - Have fun—If you are engaged in the story and enjoying yourself, your group will likely model that behavior.

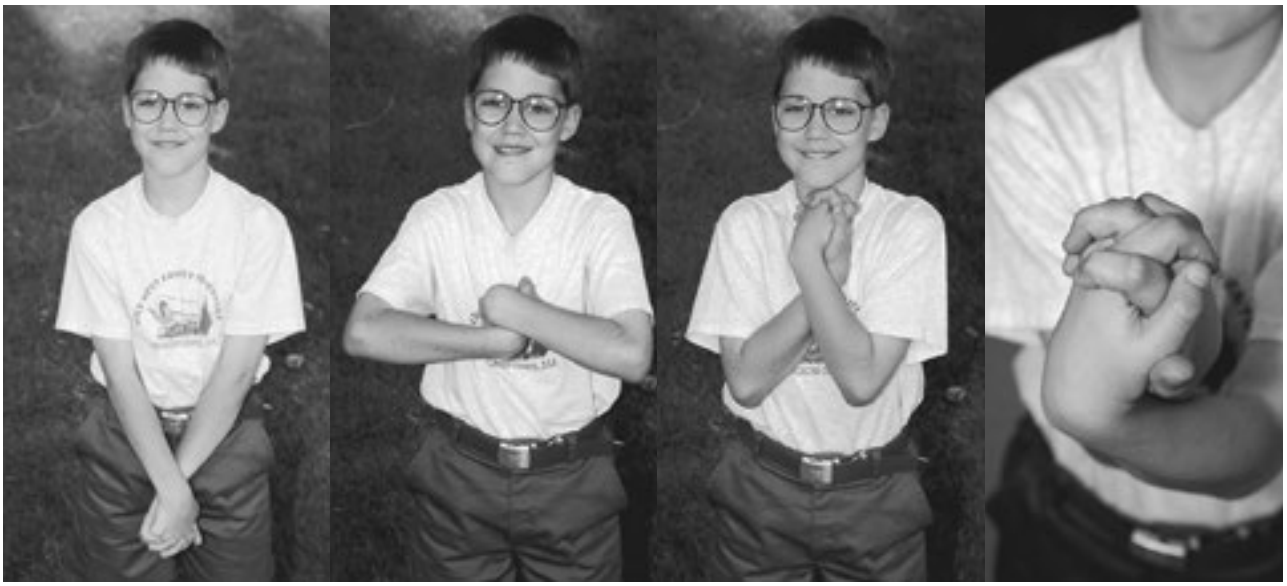
CHAPTER 19

Trust Activities

DEFINITION OF TRUST

Trust can be defined as the capacity to rely on a person's integrity, strength, ability, and sense of responsibility toward others. When you trust someone, you feel confident that he or she has your best interests at heart. They wouldn't do anything to hurt you just for the fun of it or for personal gain. In turn, you can earn a person's trust by proving yourself to him or her. You can show them that you will not take advantage of them nor abuse their trust in you. Trust is a "two-way street"; in order to receive trust, you have to be willing to give it back. When speaking about trust, it's important to remember that actions speak louder than words!
The adage "Nobody cares how much you know until they know how much you care" illustrates that caring about others is one of the basic, and perhaps the most important, components in building trust.

PARTICIPANT POSTURE



With arms outstretched in front of you, (1) cross your wrists and clasp hands. Maintain this grip (2) and move elbows outward and hands toward your body. Turn your hands up (3) and bring elbows close to your body. Maintain this grip (4) during trust events to avoid hitting spotters with a loose arm or hand.

TRUST EVENTS

Trust Wave

Challenge and Objective

The group stands or sits in two parallel lines, facing one another. Each person holds arms and hands (palms down) in front, parallel to the ground. Participants are close enough so that their hands overlap and they alternate their hands so that the adjacent person's hands are in between their hands. Choose someone to walk toward the outstretched hands. Just before this individual reaches the hands, participants raise them and then lower them as soon as the walker has passed underneath.

Setup and Inspection of the Event

Make sure there is adequate room between the two parallel lines of participants for the walker to comfortably pass through.

Safety Precautions to Consider

Clear the area of debris and obstructions, including day packs or jackets.

Variations for Accomplishing the Event

- Have a person run between the parallel lines of participants.
- Have the participants kneel or squat for a person in a wheelchair.
- Have participants form a circle and do the wave while seated in a circle. Change directions of the wave in the circle.

Trust Duo

Challenge and Objective

With a spotter in front and one behind, the participant falls either backward or forward. The appropriate spotter catches the faller and returns the participant to an upright position. The objective is to teach the participant to trust spotters, and to teach spotters how to spot properly. All participants will learn the verbal commands used by spotters and fallers.

Setup and Inspection of the Event

N/A

Safety Precautions to Consider

- Clear the area of obstacles.
- Spotters need a solid stance to avoid being pushed over or out of position by the faller.
- Be sure the faller and spotters know the proper commands:

Faller	Spotters
"Spotters ready?"	"Spotters ready" or "Spotters not ready."
"Falling!"	"Fall on."

Human Spring

Challenge and Objective

With their hands outstretched in front of them, two participants lean toward each other, each preventing forward momentum by placing the palms of hands against those of the other. The participants then push off against each other's palms and return to their upright starting positions. Participants develop trust in catching and supporting each other.

Setup and Inspection of the Event

N/A

Safety Precautions to Consider

- Ensure that the area is level and free of obstructions.
- If participants miss each other's hands as they lean forward, they can prevent butting heads by placing their palms on their partner's chest.

Variations for Accomplishing the Event

Have each pair of participants move farther apart before beginning the activity.

Trust Trio

Challenge and Objective

With hands and arms in the proper position, a participant falls backward into the hands of three spotters and is gently lowered to the ground. The participant learns to trust the spotters and the spotters learn how to spot and to support the full weight of the faller.

Setup and Inspection of the Event

N/A

Safety Precautions to Consider

- Clear the area of obstructions.
- Spotters must be ready to support the full weight of the faller.
- Have participants use proper commands.

Variations for Accomplishing the Event

Allow the faller to fall forward rather than backward.

Trust Levitation

Challenges and Objective

The participant falls backward into the team's spotting arms, is lifted to head height, and is then returned to the ground in a safe, controlled manner. The participant gains an increased level of trust for the team members by realizing that the team as a whole is able to lift his or her weight in any future challenge during low-course events. The team realizes that through teamwork it can accomplish many things.

Setup and Inspection of the Event

N/A

Safety Precautions to Consider

- Ensure the area is free of obstructions and the team members have good footing.
- The spotter at the end of the line should support the head area of the participant, positioned between the two lines of spotters to prevent the participant from falling backward as the spotters lower the participant to his or her feet.

Variations for Accomplishing the Event

Have the participants keep their eyes closed throughout the event to learn trust of their team.

Cookie Factory

Challenge and Objective

With hands outstretched overhead, a participant takes a running start and dives upward and forward, facedown, into the hands and arms of two lines of spotters. The participant gains an increased level of trust, and the spotters learn how to catch a person falling several feet.

Setup and Inspection of the Event

N/A

Safety Precautions to Consider

- Ensure the area is free of obstructions.
- Approximately nine spotters are required to perform this event safely.
- Have two lines of four spotters face each other and extend their arms and palms up.
- Spotters should alternate the positioning of their hands with the hands of spotters facing them.
- The ninth spotter stands at the end of the line to catch the faller's head.
- Spotters must keep their heads up and watch the diver.
- Spotters must be ready to catch the participant's falling weight.

Trust Circle

Challenge and Objective

A group of approximately seven to 11 participants forms a tight circle around a faller. The faller properly positions hands, arms, and elbows close to the body, then begins the sequence of commands. Keeping the body stiff, the faller may fall in any direction. The faller gains an increased sense of trust and the spotters learn to adjust their positions quickly to spot a fall that might be difficult to anticipate.

Setup and Inspection of the Event

N/A

Safety Precautions to Consider

- Clear the area of obstructions.
- No action can begin until proper commands are given.
- There should be no bantering among participants; this is a serious learning situation. Encourage the faller and keep all comments positive.

Variations for Accomplishing the Event

- Increase the size of the circle so that the faller has a greater distance to fall before being caught.
- Blindfold the faller.

Trust Fall

Challenge and Objective

A participant standing on an elevated platform falls backward into the arms of spotters standing on the ground.

Setup and Inspection of the Event

N/A

Safety Precautions to Consider

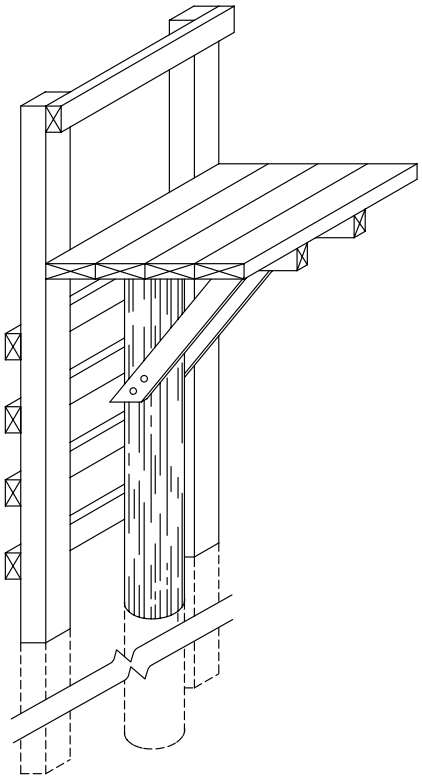
1. The catchers must be properly positioned before a faller backs to the edge of the platform.
2. Catchers form two lines facing one another, their heads back and turned toward the faller. Catchers should have their elbows and knees bent to absorb shock and reduce strain on their backs.
3. Catchers establish the correct position by alternating hands with the person across from them. (Form a zipper.)
4. The faller must keep hands and elbows folded in front. See "Participant Posture" earlier in this chapter.
5. The faller must fall with feet together, knees locked, the body straight and rigid, buttocks pinched together, the back straight, and the head back. This position can be practiced on the ground ahead of time.

6. The faller should not bend forward at the waist or sit down while falling.
7. COPE staff members can help a faller visualize how to keep the body rigid by telling the faller to keep the chin up and imagine being a straight tree or piece of lumber.

Variations for Accomplishing the Event

- Mosh Pit Catch. With higher platforms, spotters are sometimes arranged in a tight clump with knees bent, arms extended above their heads, elbows bent, and palms up in a "mosh pit" fashion. The faller prepares in a similar fashion to the above method and falls onto a bed of hands.
- Blanket Catch. Use a manufactured trust fall catch blanket where spotters hold on to the handles of the blanket with both hands and the faller falls backward onto the blanket.
- Have the faller keep his or her eyes closed while falling.

Blanket catch



Mosh pit catch

CHAPTER 20

Low-Course Activities

Spotting is normally used on low-course activities. The techniques for spotting may vary from one activity to another and may also change with the story line. For example, a facilitator may instruct the group to use conventional spotting techniques on the Triangle Traverse, and then encourage participants to Step Off Safely if they feel themselves falling on the TP Shuffle. Facilitators can provide the spotting on some activities; for instance, the group may be required to place their hand on the shoulder of "the wizard" to keep their balance when moving across the Artesian Beams. The most important job the facilitator has is to provide for the safety of people on the challenge course. Select a method that makes sense for the activity and story and maintain discipline in enforcing spotting. Note that there are some courses that use belay systems on The Wall in addition to spotting.

A successful COPE program may benefit from a crawl-walk-run approach toward individual and team development. This stage of the COPE program can best be described as the "walk" phase because it builds upon the core skills developed during the warm-up, initiative, and trust series of the program (crawl phase). Following is a description of typical low-course activities and how to safely and effectively facilitate the events. This information should be considered a starting point as you develop your program. Be creative and develop imaginative storylines as appropriate. Challenge your staff to innovate and continually improve your program.

Artesian Beams

Challenge and Objective

Together, group members must traverse a trail of posts set at varying distances from one another, utilizing a supply of 4-by-4-inch beams to span the gaps between the posts. The group will discover that the beams will fit between the posts in only one sequence. The goal is for the group to move as a team so that everyone completes the event together.

Equipment Needed

- Six permanently placed posts
- 4-by-4-inch beams of various lengths, each cut to fit between two posts

Setup and Inspection of the Event

1. Check the beams for structural integrity.
2. Ensure that the beams will fit slots in the posts and not slip out.
3. Check and clear the area of hazards.
4. Stack the beams at the starting point of the event and place in random order at angles to one another.

Safety Precautions to Consider

- Participants may not throw beams.
- Anticipate group falls.
- Everyone should step down from the last post rather than jump off.
- Facilitators and participants who are finished should spot.

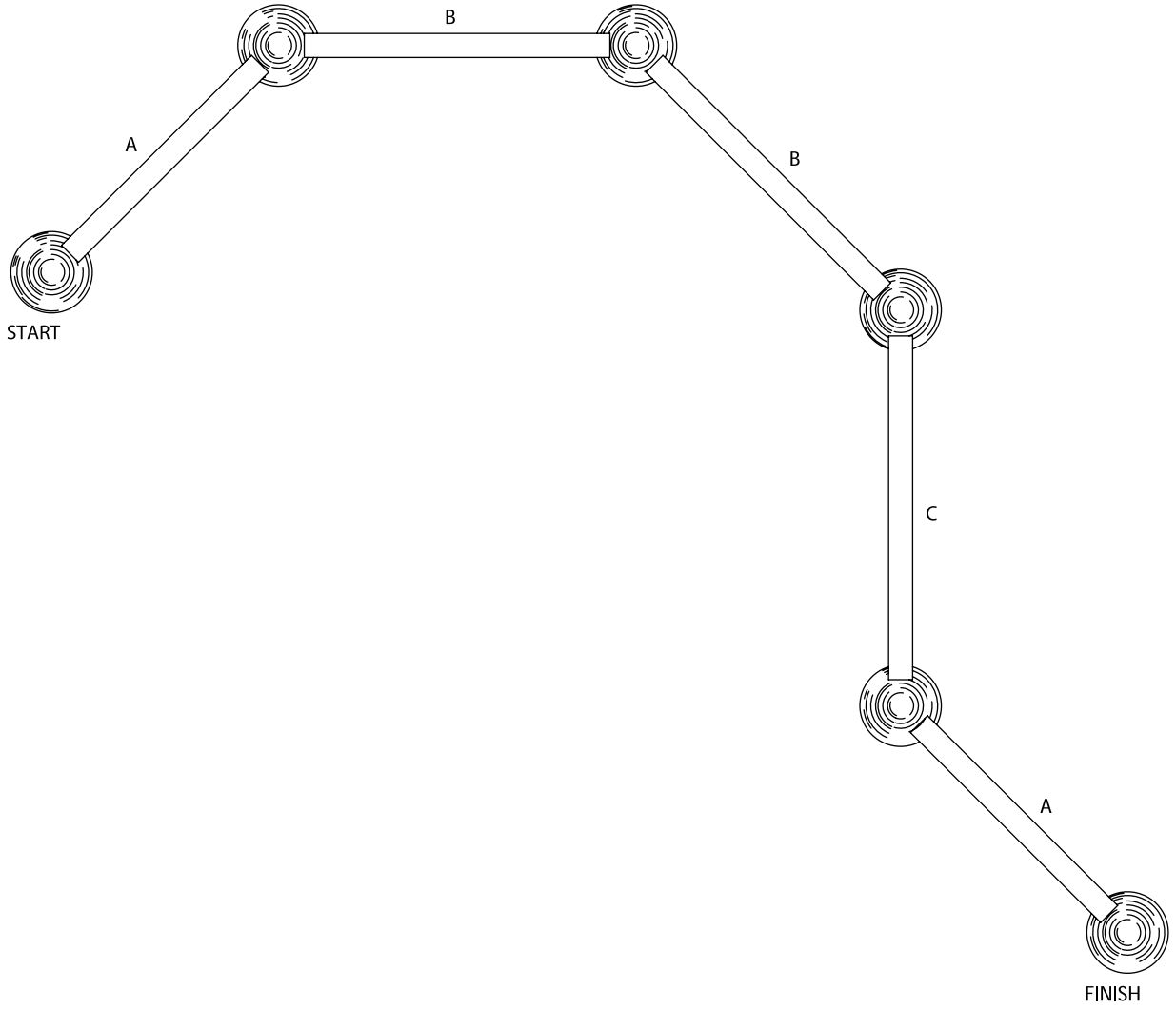
Closing the Event

Secure the beams.

Variations for Accomplishing the Event

- If a beam touches the ground, the group must start over.
- The group must carry all the beams with them from the beginning to the end of the challenge.
- Have group members refrain from verbal communication.
- Use a story line to create interest.

ARTESIAN BEAMS



The Beam

Challenge and Objective

One at a time, move all members of a group up and over the beam. Once over, a person cannot return to the other side to help. Two helpers are allowed on the beam itself. The group must work as a team to complete this event.

Equipment Needed

N/A

Setup and Inspection of the Event

N/A

Safety Precautions to Consider

- Ensure the ground below the beam is free of obstructions.
- A person's head must always be higher than the feet.
- Participants stepping off the beam must land feetfirst.
- Watch out for kicking feet.
- Spotters should be positioned to protect each climber and any helpers on the beam.
- Prevent climbers from falling backward by spotting them in such a way that their feet will not swing under the beam.

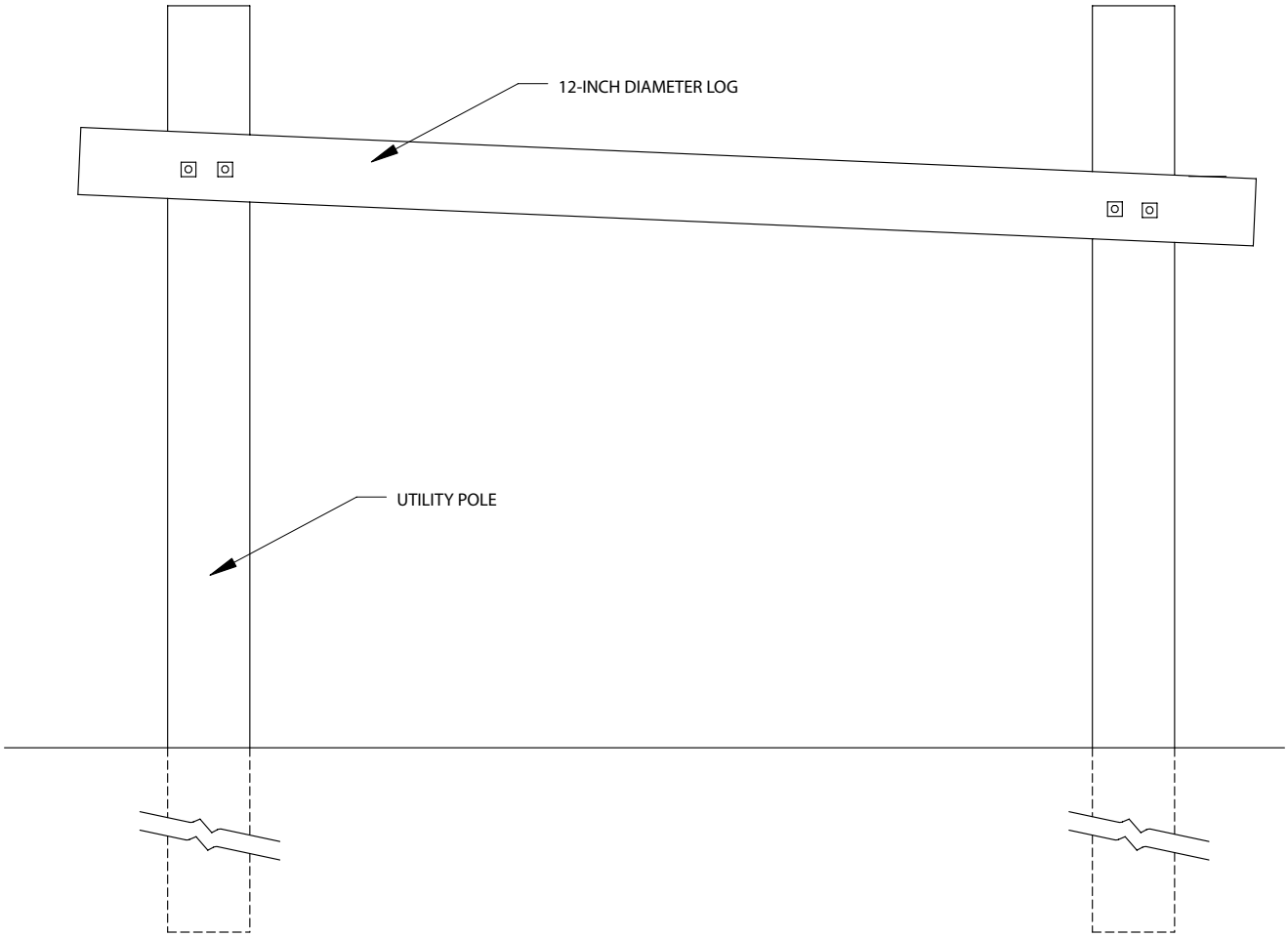
Closing the Event

N/A

Variations for Accomplishing the Event

- Attempt the activity without verbal communication.
- One team member must go over the beam without touching it.
- Let the group decide whether to cross the beam at the high end, at the low end, or in the middle.

THE BEAM



Cable Traverse

Challenge and Objective

Two participants step up onto the cable, one from each end. Using their ropes for balance, they approach each other. When they meet in the center, they can grasp hands and support each other as they pass, exchange ropes, and continue to the opposite end of the cable.

Equipment Needed

Two overhead support hand ropes that will reach the center of the cable when pulled inward from the sides.

Setup and Inspection of the Event

1. Connect the two support ropes.
2. Inspect all cable connections for security.

Safety Precautions to Consider

- Spot participants as they climb onto the cables.
- A spotter will move with each participant to the center of the event, then spot the other participant back.
- Spotters must anticipate a fall by positioning themselves in the direction the rope will pull a faller if the participant swings while falling from the cable.

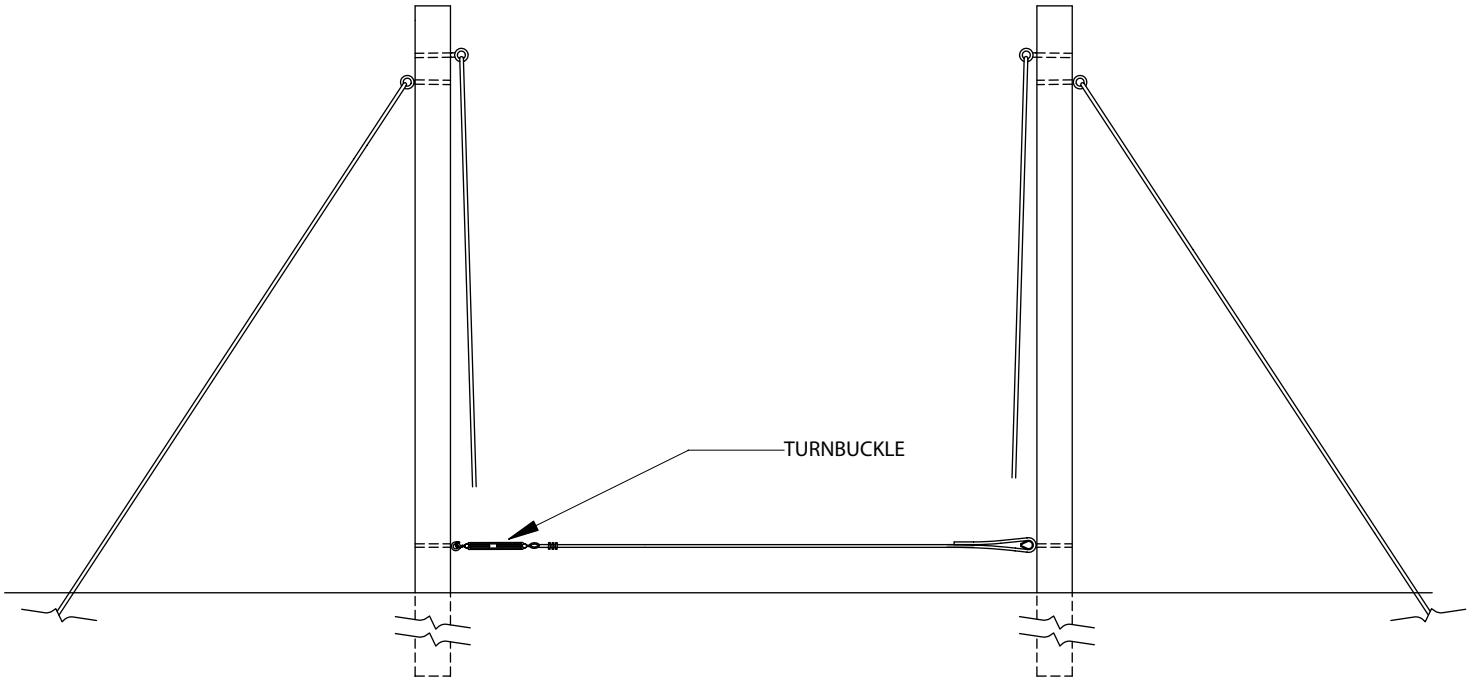
Closing the Event

1. Remove and secure the balance ropes.
2. Disable the cable.

Variations for Accomplishing the Event

- Have participant keep eyes closed.
- Have two participants from each end try to balance with each rope, pass the other pair in the center of the cable, and progress to the opposite end.

CABLE TRAVERSE



NOTE:
TURNBUCKLES CAN BE USED FOR DISABLING EVENTS AS WELL AS TO MAINTAIN PROPER TENSION.

Criss Cross

Challenge and Objective

Two participants, one starting on each end of the "X," traverse to the opposite ends of crossed cables without touching the ground.

Equipment Needed

N/A

Setup and Inspection of the Event

Inspect all connections.

Safety Precautions to Consider

1. Spotters on the ground move alongside each participant.
2. Spotters must be especially attentive as a participant mounts the cables, reaches the point where the cables cross, and steps down to the ground.
3. Participants may not traverse faster than spotters can follow.

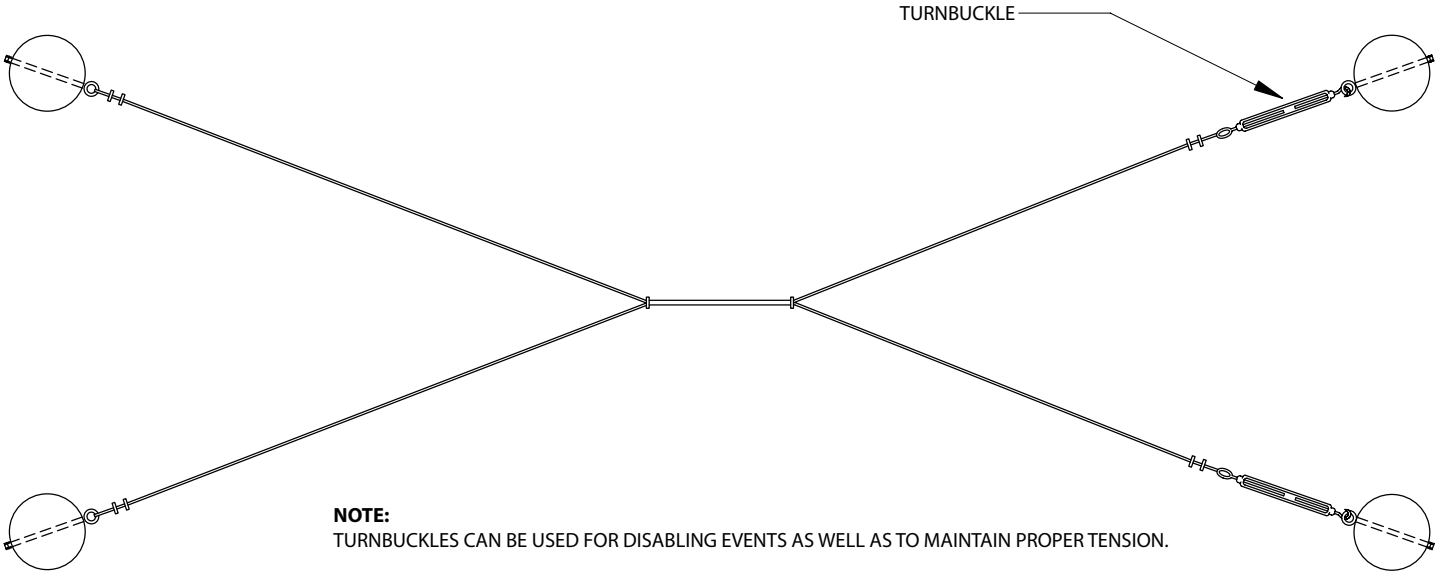
Closing the Event

Follow local disabling procedures if used.

Variations for Accomplishing the Event

- Have participants refrain from verbal communication.
- Have participants keep eyes closed.
- Allow the use of only one hand to pass the partner.
- Have two pairs of participants attempt to cross simultaneously in opposite directions.

CRISS CROSS



NOTE:
TURNBUCKLES CAN BE USED FOR DISABLING EVENTS AS WELL AS TO MAINTAIN PROPER TENSION.

Drop Zone

Challenge and Objective

One at a time, all members of a group swing over a chasm and land in an unoccupied, designated zone on the other side. If anyone misses a zone or lands in an occupied zone, the entire group must start over. The group works as a team to complete this event.

Equipment Needed

- Rope with several knots to provide hand grips
- Locking carabiner or rapid link (½-inch or ⅝-inch)
- Hoops or wooden disks about 30 inches in diameter
- Ladder to attach rope to cable lead

Setup and Inspection of the Event

1. Use the carabiner to attach the rope to the cable lead.
2. Place disks on the ground near the fall line of the rope and cable.

Safety Precautions to Consider

- If wooden disks are used, make sure they do not wobble.
- Have participants remove watches or jewelry that might get snagged.
- Someone must spot the person on the ladder.

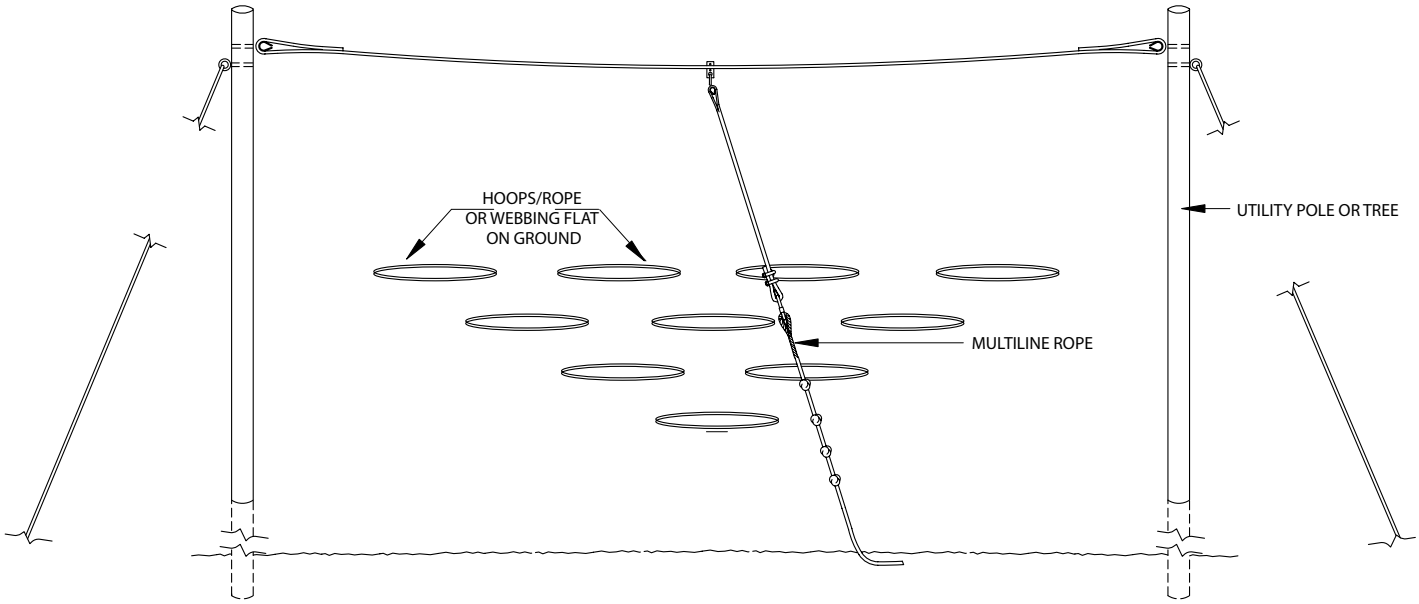
Closing the Event

Remove the rope from the cable lead.

Variations for Accomplishing the Event

- Use more disks as landing zones than there are participants.
- Allow more than one participant to occupy the same zone.
- Have participants carry something across the chasm with them (a beach ball, for instance).
- Use a story line to create interest.

DROP ZONE


HOOPS/ROPE
OR WEBBING FLAT
ON GROUND
UTILITY POLE OR TREE
MULTILINE ROPE

Islands

Challenge and Objective

Start with half the group on each of the three end islands, then swap ends without touching the ground.

Equipment Needed

- Two 6-foot, 1-by-8-inch boards
- One 4-foot, 1-by-8-inch board

Setup and Inspection of the Event

1. Check the islands for structural integrity.
2. Check the boards for splinters.

Safety Precautions to Consider

Spotters must be positioned throughout this event.

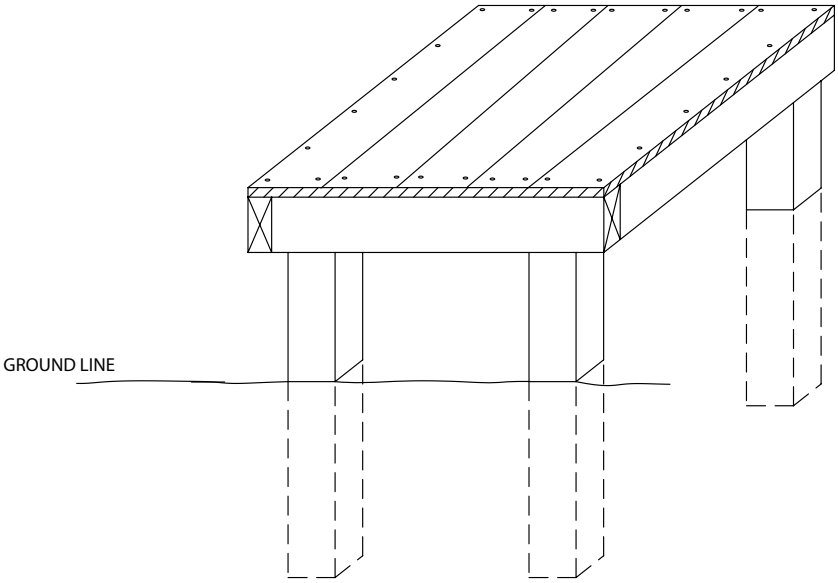
Closing the Event

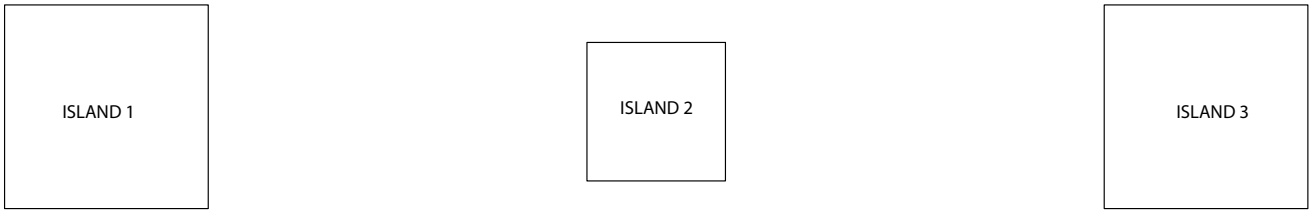
Secure the boards.

Variations for Accomplishing the Event

- Blindfold some participants.
- Prohibit some participants from speaking.

ISLANDS





PLAN VIEW

Mohawk Walk

Challenge and Objective

Without touching the ground, the entire group walks as far as possible toward the end of the cable.

Equipment Needed

Rope

Setup and Inspection of the Event

1. Attach rope to the cable lead.
2. Check all cables and connections for conditions.
3. Check cables for proper tension.

Safety Precautions to Consider

- This event must be carefully spotted.
- Participants may touch the cable only with their feet (no sitting or pulling across with the hands).
- Warn participants to avoid falling with their legs straddling a cable.
- Do not allow running.
- Facilitators should spot participants.
- Instruct participants to let go of the rope in the event of a fall.

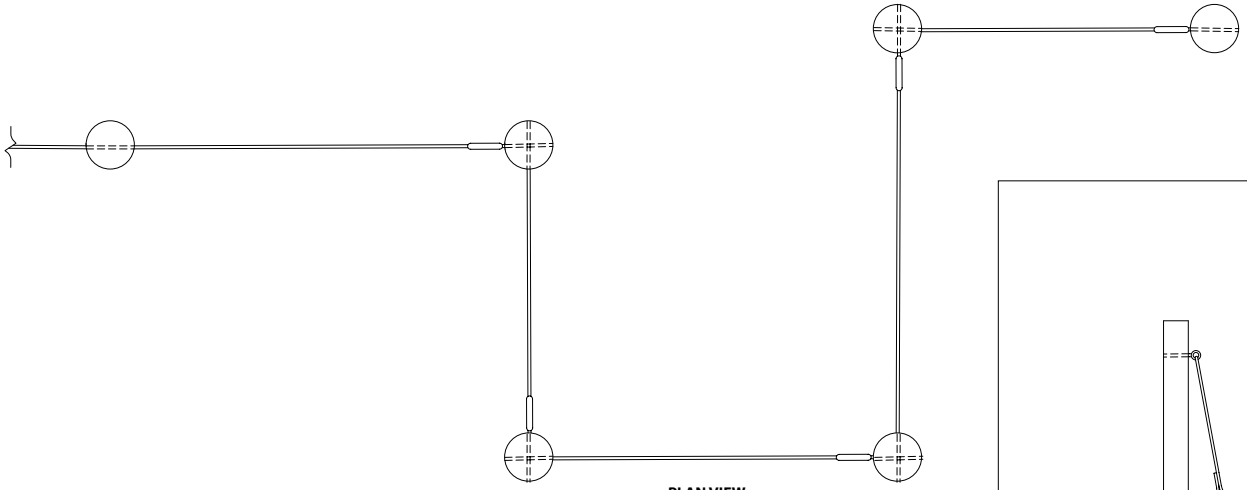
Closing the Event

Disconnect the rope from the cable drop. If appropriate, loosen turnbuckles and remove the cables.

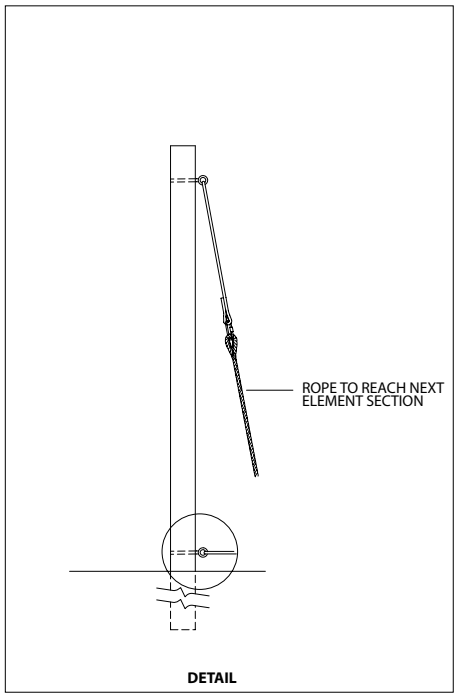
Variations for Accomplishing the Event

- Large groups can be split into two teams that start at either end of the cables and pass each other. There must be enough spotters to protect every participant on the cables.
- Accomplish the task with nonverbal communication.
- Disable some or all participants. (For example, let them use only one arm.)
- Limit the number of people on a cable at one time.
- Vary rules about where a person may start again after falling from the cable: all the way back to the beginning, back to a previous tree, or at the point of the fall.
- Make the challenge easier by allowing a certain number of touches to the ground without penalty.

MOHAWK WALK



PLAN VIEW



DETAIL

Nitro Crossing

Challenge and Objective

An entire group must cross a "ravine," carrying with them a container of "nitro" fluid. Group members may not touch the ground or spill any of the nitro.

Equipment Needed

- Rope
- Nitro container

Setup and Inspection of the Event

1. Inspect rope for wear.
2. Connect the rope to the cable.
3. Inspect the cable system for security.

Safety Precautions to Consider

- Do not allow participants to swing toward trees or anchors.
- Do not allow anything to be thrown across the ravine.
- Spot participants as they dismount.

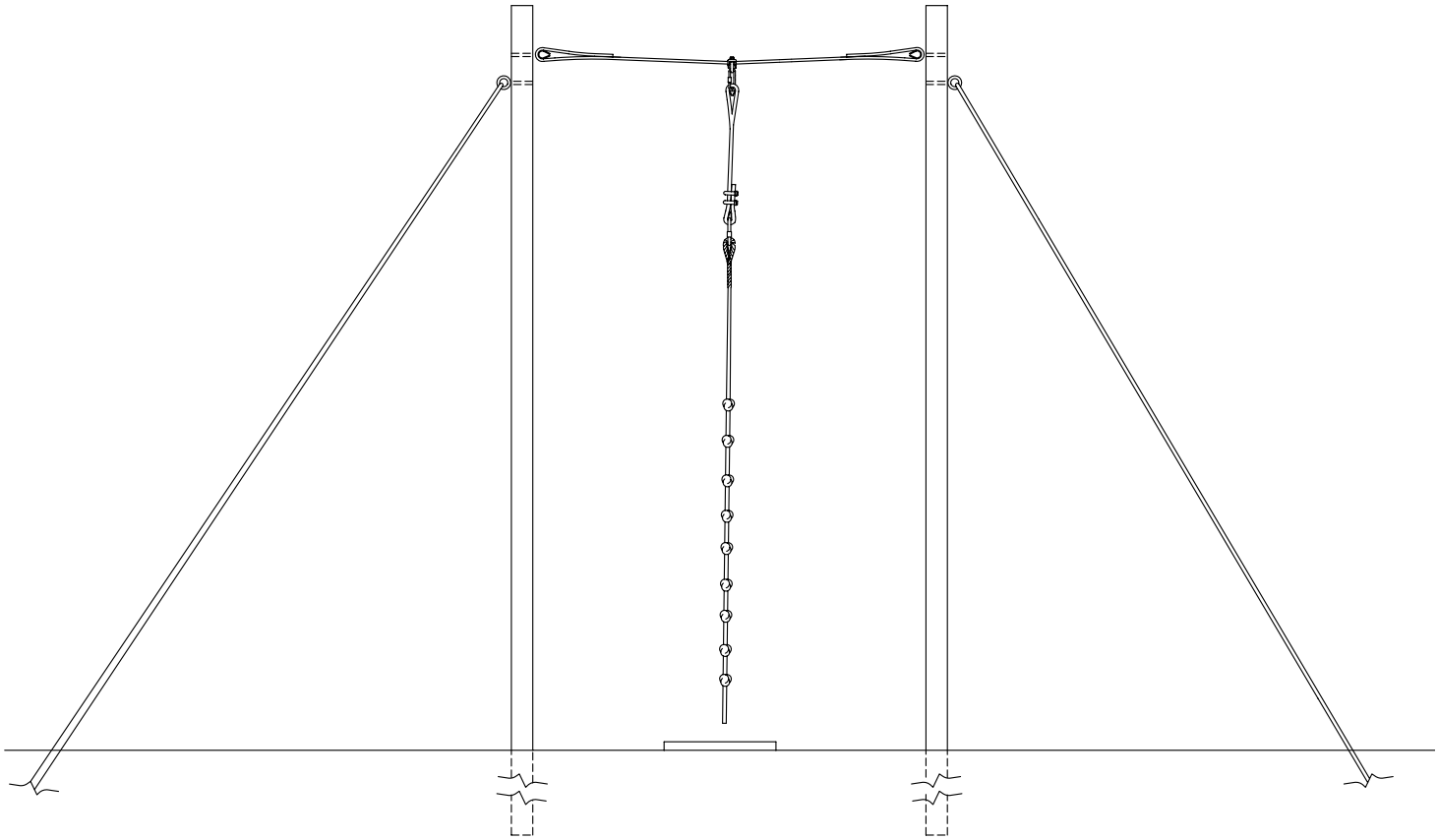
Closing the Event

Secure the rope and nitro container.

Variations for Accomplishing the Event

- Accomplish the task with nonverbal communication.
- Have the group return across the ravine.
- Split the group into two teams and have the teams cross the ravine in opposite directions.
- Impose a disability on any participant who lands in the ravine (use of only one arm, for example).
- Use a story line to create interest

NITRO CROSSING



Porthole

Challenge and Objective

The group must get everyone through a suspended tire.

Equipment Needed

N/A

Setup and Inspection of the Event

1. Inspect all connections for wear, cracks, and rust.
2. Inspect the ropes or cables for twisting and kinks.
3. Inspect the tire for debris and insects.

Safety Precautions to Consider

- Each person must land feetfirst.
- Participants' heads must be kept higher than their feet.
- No one may be thrown through the tire.
- Beware of kicking feet.
- When helping someone through, participants must avoid injury by keeping their backs straight and lifting with the power of their legs. No one may step on the lower backs or heads of teammates.

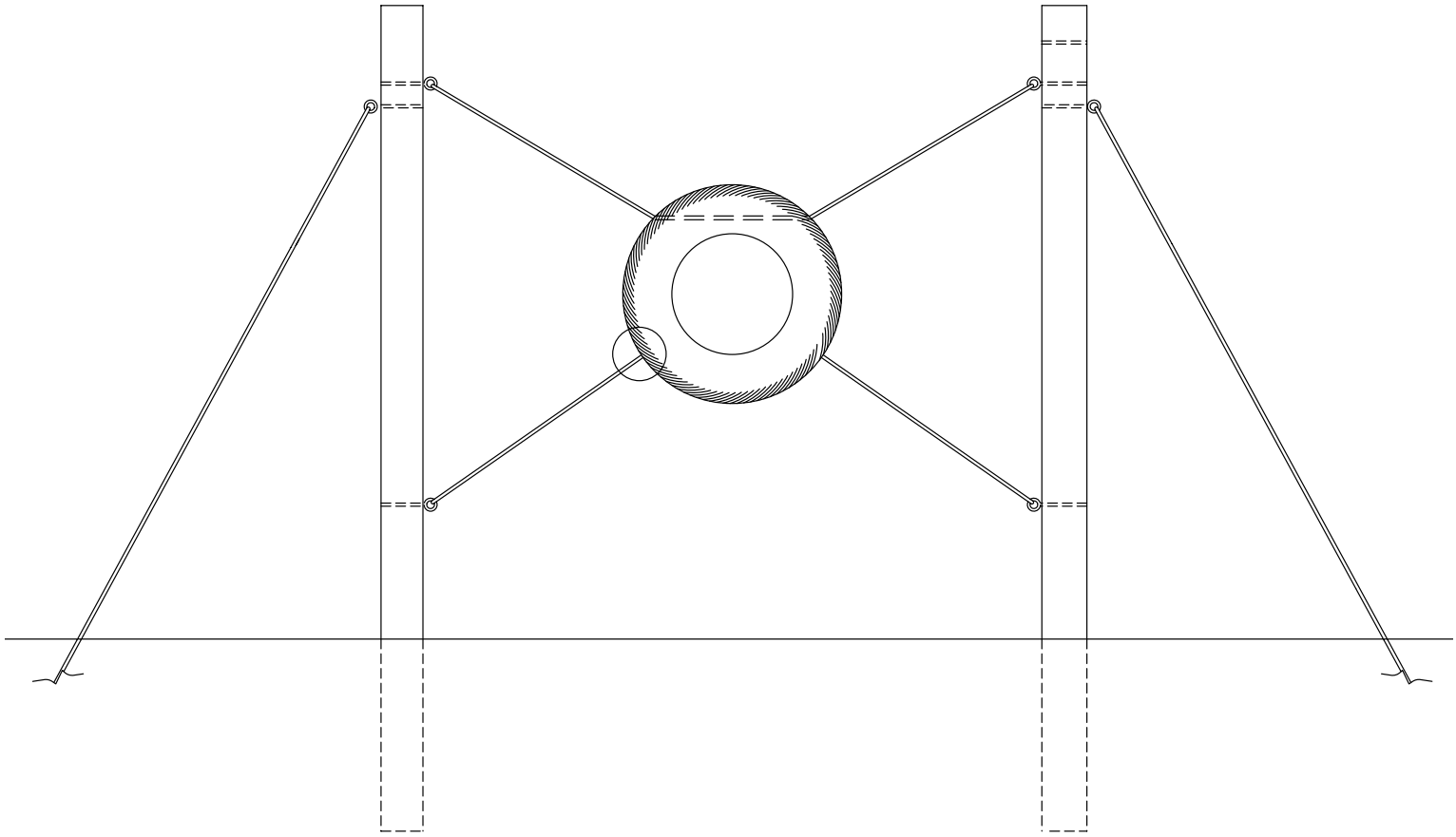
Closing the Event

Note: If rapid links are used to connect the cables to the tire, the Porthole can be disabled.

Variations for Accomplishing the Event

- Accomplish the task with nonverbal communication.
- Allow participants to be passed through the porthole feetfirst only.

PORTHOLE



Spiderweb

Challenge and Objective

Participants must pass all group members through the "spiderweb."

Equipment Needed

N/A

Setup and Inspection of the Event

Inspect the Spiderweb connections for security.

Safety Precautions to Consider

- Each person must land feetfirst.
- Participants must keep their heads higher than their feet and go through feetfirst.
- No one may be thrown through the web.
- Do not allow running or diving through the holes.
- Beware of kicking feet.
- When helping someone through, participants must avoid injury by keeping their backs straight and lifting with the power of their legs. No one may step on the lower backs or heads of teammates.

Closing the Event

Secure the Spiderweb.

Variations for Accomplishing the Event

- Disable some participants (use of only one arm, for example).
- Restrict some participants from talking.
- Attach a bell to the web; players must start over if the bell rings.

Swinging Log

Challenge and Objective

As a group, players must mount the log simultaneously and remain balanced on it for 10 seconds.

Equipment Needed

N/A

Setup and Inspection of the Event

1. Inspect connections for security.
2. Inspect the condition of the log.

Safety Precautions to Consider

- Warn the spotters about the possibility of being hit by the log.
- Warn the spotters that participants on the log may fling out their hands.
- Instruct participants not to jump from the log if they start to fall, but to step down and then spot the log to prevent it from swinging back into someone else.
- Do not allow running across the log.
- Facilitators should spot participants.

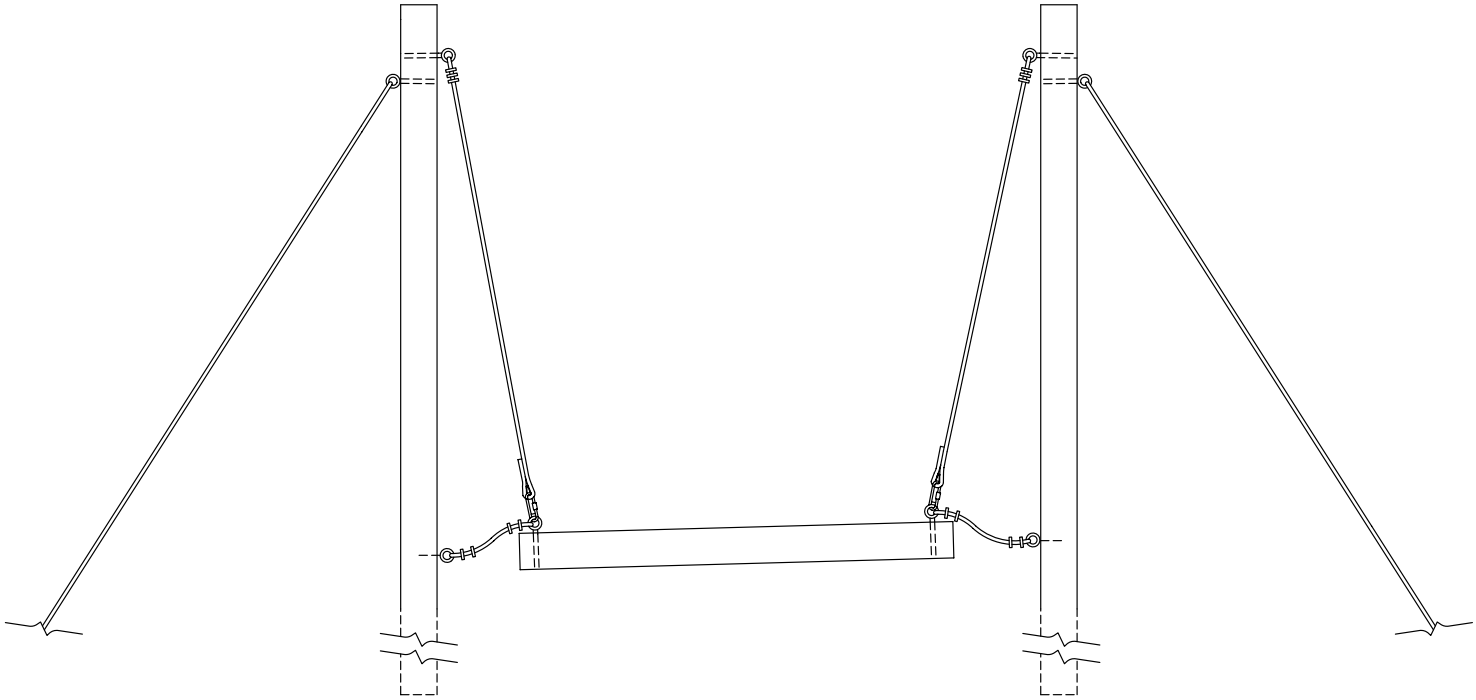
Closing the Event

To prevent it from swinging, secure the log by locking it to the tree, or drop to the ground if connected with rapid links.

Variations for Accomplishing the Event

- Without touching the ground, have participants walk the length of the swinging log.
- Instruct spotters to provide minimal assistance.

SWINGING LOG



Tire on Pole

Challenge and Objective

The group must put a tire on a pole, lower it to the ground, and then remove it.

Equipment Needed

A tire

Setup and Inspection of the Event

1. Inspect the condition and stability of the pole.
2. Inspect the tire for debris and insects.

Safety Precautions to Consider

- Group members must spot for one another and watch for a fall in any direction.
- Caution the group to watch out for the tire if it falls.
- Participants higher than shoulder height should wear a helmet.

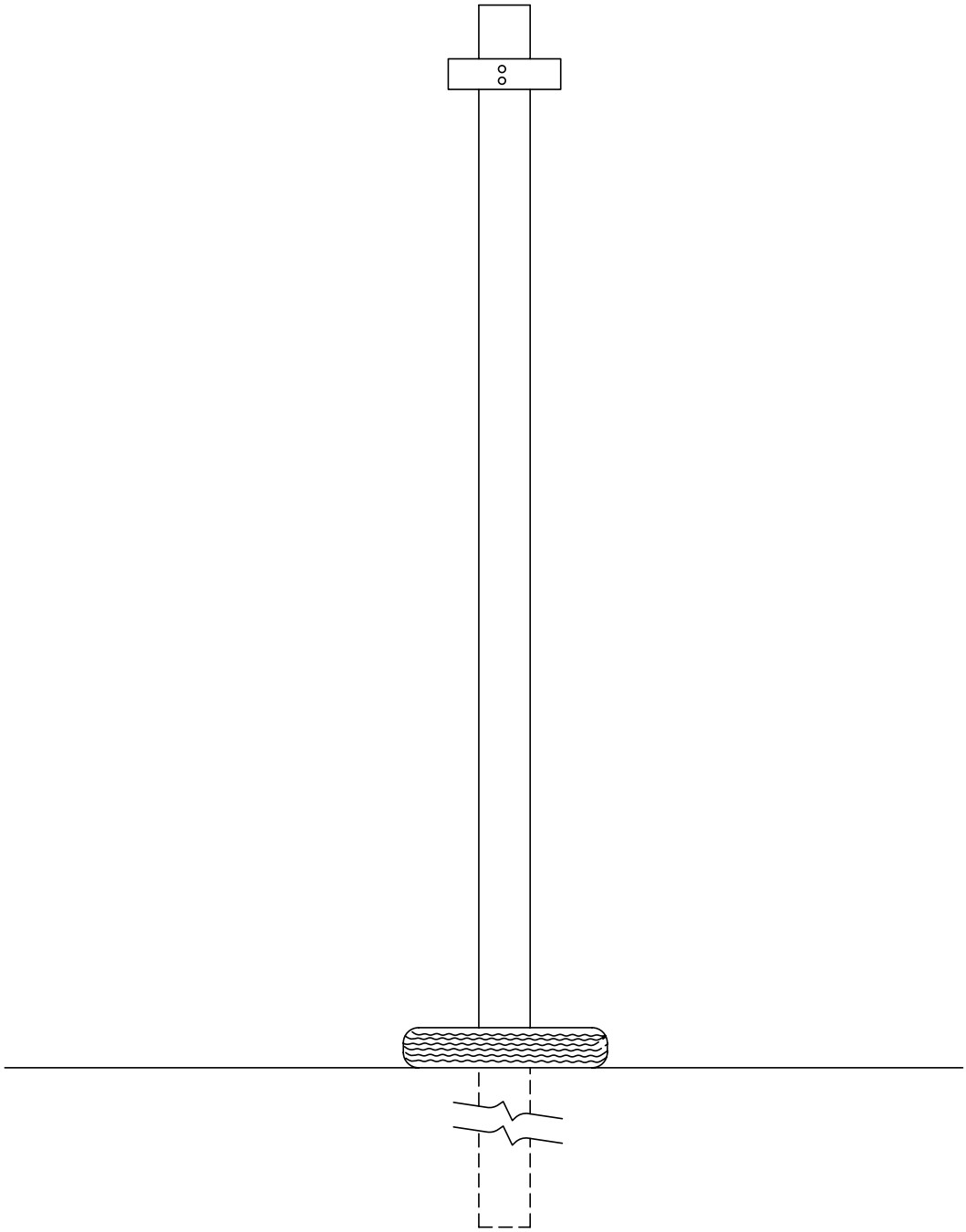
Closing the Event

Secure the tire so that rainwater can drain from it.

Variations for Accomplishing the Event

- Challenge one or more players to participate in the activity using only one arm.
- Restrict group members within 5 feet of the pole from communicating verbally.

TIRE ON POLE



Tire Traverse

Challenge and Objective

Group members must travel from a platform to a rope or platform at the far end of the event without touching the ground.

Equipment Needed

N/A

Setup and Inspection of the Event

1. Remove the disabling device, which is a locked cable securing the tires to a tree or pole.
2. Check the condition of ropes and wires.

Safety Precautions to Consider

- Watch out for swinging tires.
- Spot carefully at the platform.
- Be aware that participants may tire rapidly.
- Do not allow participants to place their feet inside a tire (between the sidewalls) where a leg could be trapped during a fall. Ideally, the tires should be wrapped in such a way that the foot cannot slip inside. Sisal rope works well.

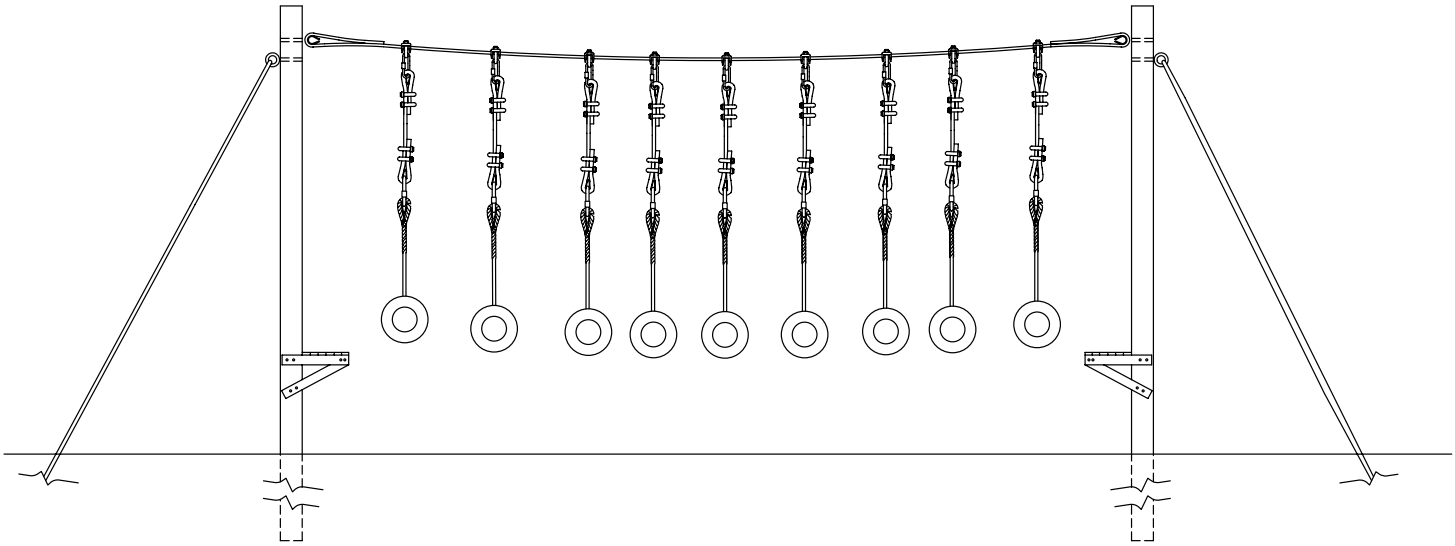
Closing the Event

Replace the disabling device.

Variations for Accomplishing the Event

If a participant touches the ground, the entire group must start over.

TIRE TRAVERSE



Track Walk

Challenge and Objective

Together, team members traverse a series of wooden balance beams.

Equipment Needed

Beams

Setup and Inspection

1. Make sure each beam is firmly seated in its slots.
2. Check beams for cracks or splinters.
3. Inspect posts for cracks or structural defects.

Safety Precautions to Consider

- Do not allow running.
- Position one spotter on each side of each participant moving on the beams.

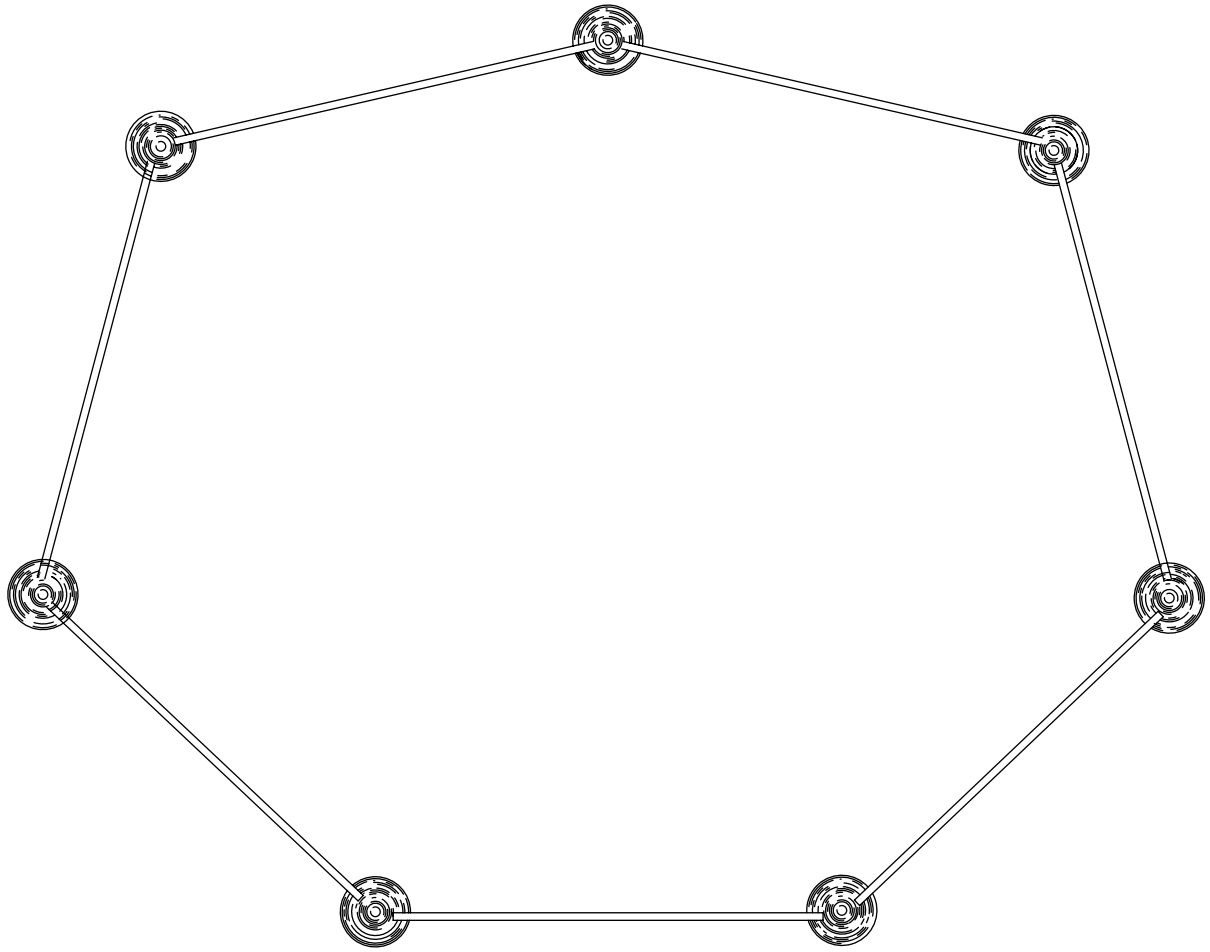
Closing the Event

Remove the beams from their slots and store them in a locked enclosure.

Variations for Accomplishing the Event

- Start from the opposite end.
- At the instructor's signal, the group must reverse its direction.
- Half of the team begins at each end of the beams. Participants must pass one another to reach the far end.

TRACK WALK



NOTE: A SINGLE OVERHEAD ROPE IS PROVIDED FOR STABILITY.

Triangle Traverse

Challenge and Objective

Participants mount the triangle traverse at the corners, using trees, poles, or overhead ropes for support. Each participant walks as far as possible along the three cables that form the triangle, at the same time helping balance a teammate traversing the cables from the opposite direction.

Equipment Needed

- Ropes to clip into cable leads
- Two locking carabiners

Setup and Inspection of the Event

1. Connect two support ropes.
2. Inspect all cable connections for security.
3. Inspect cable for proper tension.

Safety Precautions to Consider

- Spot participants as they climb onto cables.
- Spot participants on both sides of the cable.
- Spotters should be aware that a tug on the rope by one participant will affect the balance of the other.

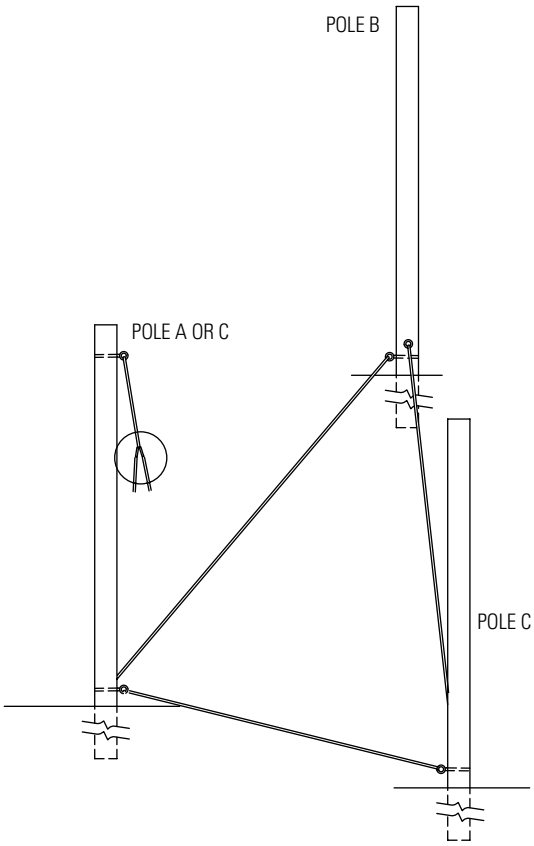
Closing the Event

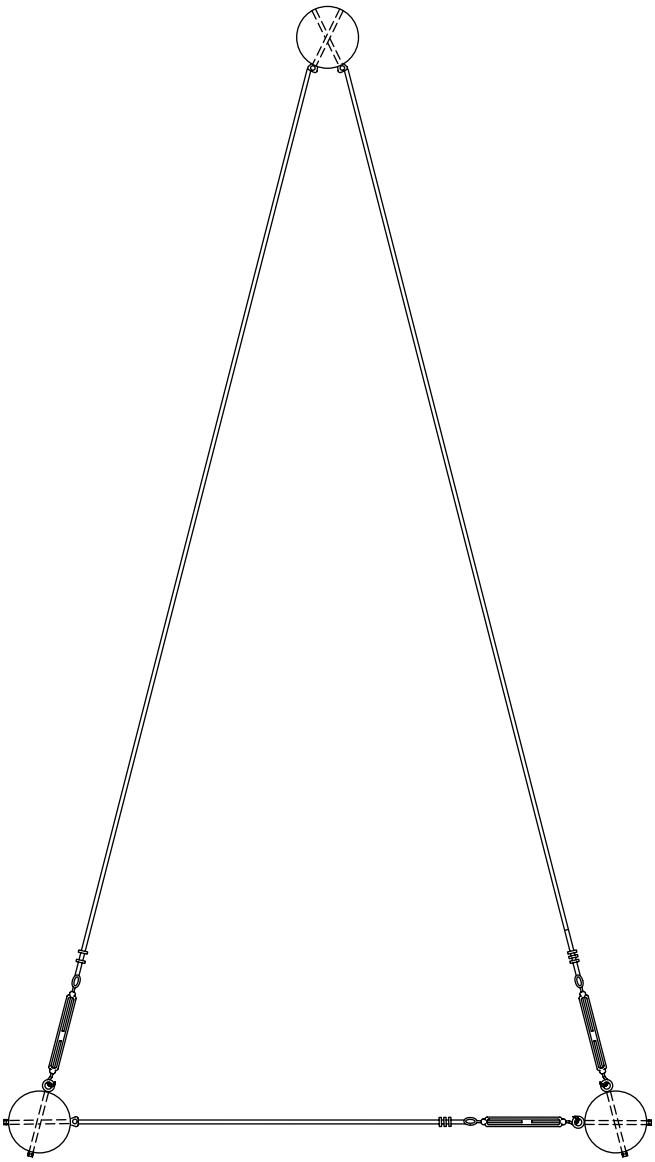
1. Remove the ropes from the cable lead.
2. Disable the cables from their attachments.

Variations for Accomplishing the Event

- Have participants keep eyes closed.
- Restrict players from verbal communication.

TRIANGLE TRAVERSE





The Wall

Challenge and Objective

The entire group must climb over the wall and down the other side.

Equipment Needed

A ladder and helmets for all participants

Setup and Inspection of the Event

1. Position the ladder to allow access to the wall platform.
2. Check the wall for cracks, smoothness, or splinters.
3. Check the platform for structural soundness.
4. Check hardware for rust and broken, loose, or missing nuts and bolts.
5. Check supporting trees for soundness.
6. Check for overhanging branches.

Safety Precautions to Consider

- Be sure there are enough spotters.
- Spotting must be strictly enforced.
- Spotters must anticipate a fall from any direction.
- Spotters must be aware of kicking feet.
- Participants on top of the wall must have both feet on the platform at all times.
- Instruct participants not to position their rib cage across the top of the wall while on top of the platform.
- Participants may not pull one another by the belt or belt loops.
- If a participant says, “That hurts,” immediately stop whatever is being done.
- Keep the ascending participant close to the wall to prevent falling backward.
- Spot the participant descending on the ladder.

Closing the Event

Disable the wall by removing the ladder.

Variations for Accomplishing the Event

- Conduct the activity in silence.
- Disable one or more participants (use of only one arm, for example).

Water Wheel

Challenge and Objective

One person at a time, the entire group must go over the water wheel.

Equipment Needed

N/A

Setup and Inspection of the Event

Check the element for structural integrity.

Safety Precautions to Consider

- Participants' heads must be kept higher than their feet.
- Everyone must land feetfirst.
- Do not let the wheel spin wildly.
- Catch each person coming over the wheel at the waist and lower to the ground feetfirst.
- Spot participants so that they do not swing back under the wheel.

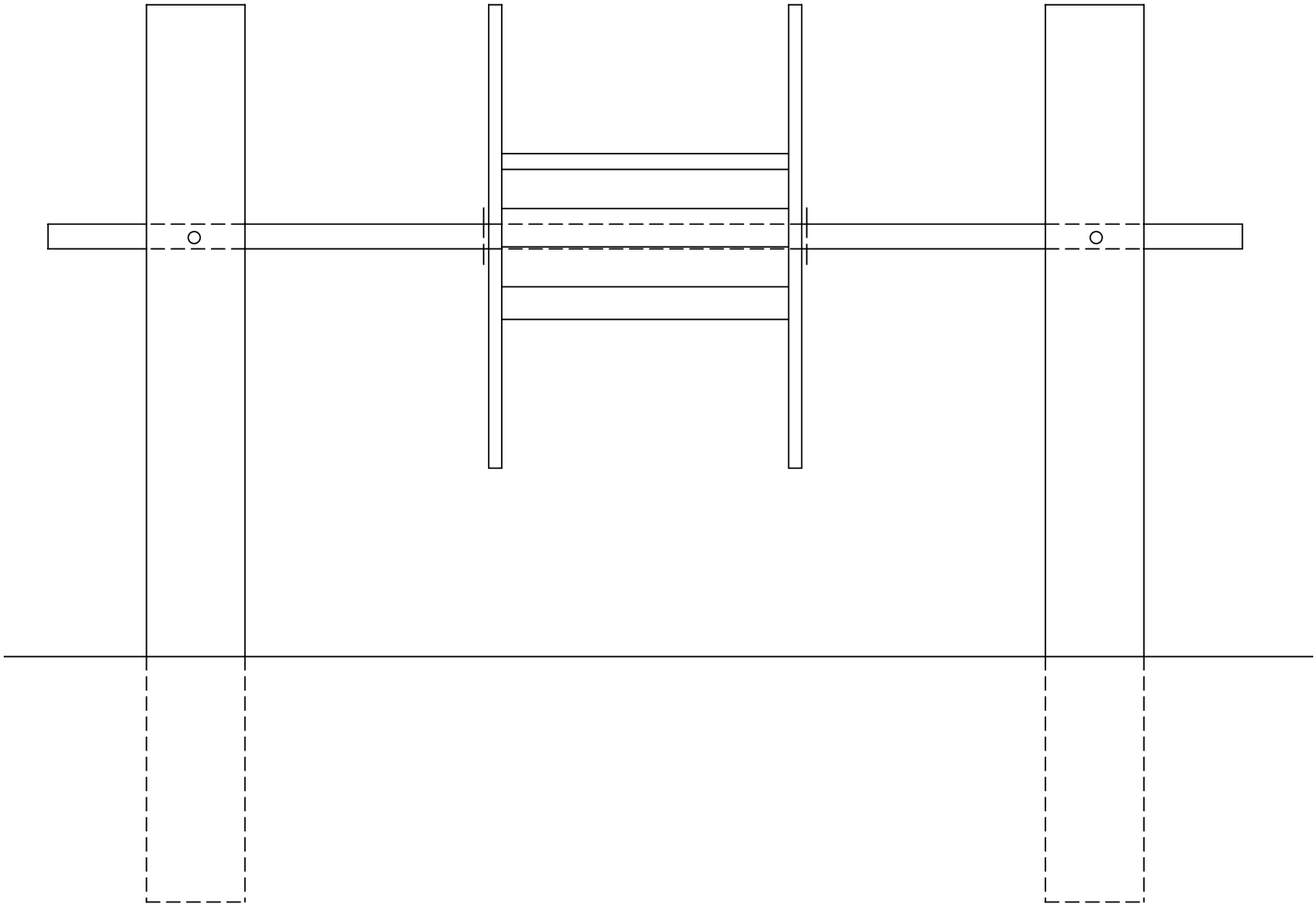
Closing the Event

Secure the water wheel so that it will not turn.

Variations for Accomplishing the Event

- Have participant keep eyes closed.
- Disable a participant (use of only one arm, for example).

WATER WHEEL



Whale Watch

Challenge and Objective

The group performs a variety of tasks while standing on a wooden platform balanced on a 10-foot-long, 6-by-6-inch beam.

Equipment Needed

N/A

Setup and Inspection of the Event

1. Check the platform for cracked or loose boards or protruding screws.
2. Make sure the planks are properly placed to prevent a foot entrapment.
3. Raise the platform to check for wildlife such as snakes or skunks that may have taken refuge or shelter under the platform.
4. Check for ants, ticks, and poisonous plants in the area.

Safety Precautions to Consider

See "Setup and Inspection of the Event."

Closing the Event

Follow local disabling procedures if used.

Variations for Accomplishing the Event

- Split the group in half at opposite ends of the platform. The group boards the "ship" without allowing the platform to touch the ground.
- The divided group changes ends of the platform without letting it touch the ground.
- With participants standing on the outside edge of the platform, the group rotates 360 degrees without letting the platform touch the ground.
- With the divided group standing on the ground at each end of the platform, participants exchange ends with the fewest platform ground touches.
- With the group balanced in the center of the platform, participants move to the ends of the platform with the fewest possible platform ground touches.
- With the group balanced on the platform, everyone abandons ship (steps off the platform) without allowing the platform to touch the ground.

Wild Woosey

Challenge and Objective

Two participants standing at the apex of two cables set in a "V" configuration must walk out on the cables as far as possible, each helping the other maintain balance.

Equipment Needed

- Two helmets

Setup and Inspection of the Event

1. Inspect all cable connections for security.
2. Check cables for broken strands.

Safety Precautions to Consider

- Spot participants as they climb onto the cables.
- Spotters move with participants, spotting them throughout the challenge. Two spotters move underneath the participants to provide support in case a participant loses balance.
- Participants must keep their bodies upright.
- Participants may grasp each other's hands, but should not interlace their fingers. Interlacing could lead to injury in a fall.
- Helmets are recommended to help prevent injuries.

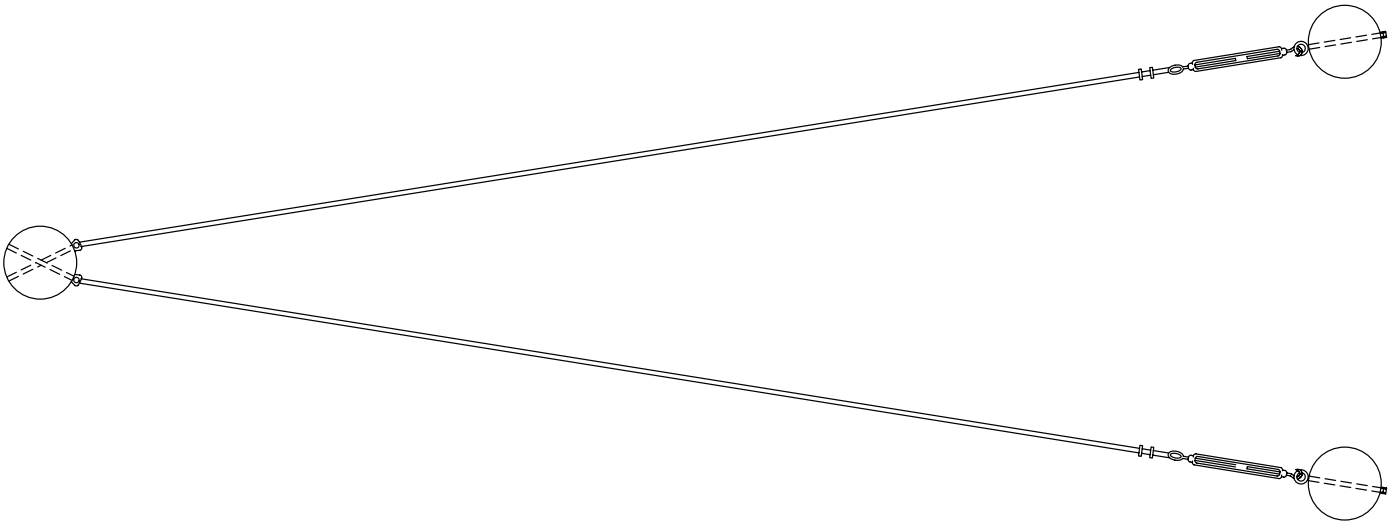
Closing the Event

Follow local disabling procedures if used.

Variations for Accomplishing the Event

- Use a 1¼-inch dowel between pairs for easier grip.

WILD WOOSEY



CHAPTER 21

High-Course Activities

Everyone on high-course activities is belayed at all times. Some important considerations for each activity are:

1. Belay method for the element
2. What equipment is necessary
3. How staff will rig this element
4. How participants will access the element
5. Any safety concerns
6. Possible incident resolution for this element
7. How the staff will disable the element
8. Variations for completion of the element

Each high course is different, and thus has different elements, rigging, safety concerns, and best practices for resolving incidents. Additionally, it might be disabled differently. It is important to be not only aware of but also familiar with the operating procedures for all of the elements on the course.

As each element is introduced to participants, they will experience a mixture of reactions. Remind participants of "Challenge by Choice," encourage them to be open about their fears, and encourage them to do their best. Participants measure success for themselves and should not compare their performance to others or to completion of the element. Encourage participants not to hold onto their belay line for support but rather to trust themselves, their team, and their equipment.

There are many types of high elements. While all high elements may not be covered in this manual, they will fall into one of the following categories:

- Ascending/descending elements
- Traversing elements
- Swinging elements
- Jumping/diving elements
- Zip lines

Some of the ascending/descending elements your course may have include:

- Cargo Net—can also be a traversing element
- Caving Ladder
- Centipede
- Confidence Pole
- Flying Squirrel
- Giant's Ladder
- Vertical Playground

Some of the traversing elements your course may have include:

- Balance Beam
- Burma Bridge
- Commando Climb
- Multiline Traverse
- Pirate's Crossing
- Sky Walk
- Slack Line Traverse

Considerations

What type of belay system does each element utilize?

- Fixed anchor belay team
- Dynamic movable belay team
- Just-Right Descender
- Static belay
- Belay team (Flying Squirrel)

What equipment is necessary to facilitate this element?

- Helmets
- Gloves
- Harnesses
- Belay equipment (CHECK)

How will the participant access the element?

- Caving Ladder
- Cargo Net
- Pole climb
- Commando Climb

Note that the participant may already be at height.

What safety precautions should staff consider for each element?

- What is the condition of the poles?
  - Should participants wear gloves due to splinters or chemical treatments on poles?
- Has the cable, rope, net, or beam been weight tested?
- What is the condition of the cable, rope, net, or beam?
- Environmental conditions, including weather, downed brush or trees, and distractions.
- How is the belayer anchored? A movable belay is recommended for traversing elements to limit any "pendulum effect" participants might experience if they fall. This can be accomplished in a variety of ways, but generally consists of a belayer, a backup belayer, and a person who is tethered to the belay device to provide additional weight for the anchor team. An additional person can be assigned to manage the rope and keep it out of the way of the

belay team. The team moves on the ground as the belayer moves across the element keeping in line with them. This reduces the pendulum effect created from the belay cable pulley rolling to the low point in the center of the belay cable. This technique is effective, and also gives more participants an active role in the activity.

- Where will the belayer be in relation to the participant and the element?
- Are participants transferring belays at height (top of the element)?
- In traversing elements where participants are handling cable, is there any rigging they could scrape themselves on (cable clamps, etc.)?
- Where will spotters be necessary? What are the risks of falls that cannot be adequately protected by the belay? What are the potential hazards to the spotters?
- Can the participant's clothing get hung up on hardware or rigging?
- If more than one participant is on an element at the same time, they must have independent belay systems.
- Observers are kept clear of the element while in use, and all participants and observers are wearing helmets.
- What possibilities are there for incidents, accidents, or common mistakes?

Special considerations for specific elements:

- Local operating procedures should always be consulted before facilitating any challenge course elements. Elements that often have special considerations are Confidence Pole/ Pamper Pole, Flying Squirrel, and Giant Swing.

How would staff resolve incidents for this event?

- The participant has slipped off the event but wants to continue:
  - Will a vector lift get them back on the element?
  - Is an etrier or sling available to help them step back up?
  - Is it necessary to lower them to the ground?
- The participant has slipped off the event and does not want to continue or is unconscious:
  - Are you able to lower them to the ground?
  - If not, is a mechanical advantage system necessary?
  - Where are first-aid supplies located?

How will your staff disable each element?

- Remove ropes and replace with twine or P-cord.
- Disable to 12 feet.
- Remove all rigging.
- Remove ladders or steps and secure them.

There is more than one way to complete many of the high elements. Not completing an element in the "normal" way does not make it incorrect. Likewise, there are several ways to make any of these elements more difficult. Ask participants to complete the element one-handed, while blindfolded, or while carrying a stuffed animal.

Balance Beam

Challenge and Objective

Participants cross a beam secured between two poles or trees.

Equipment Needed

- Belay system
- Gloves
- Helmets

Setup and Inspection of the Event

1. Rig the belay system.
2. Check the belay system and balance beam for condition, stability, and proper rigging.

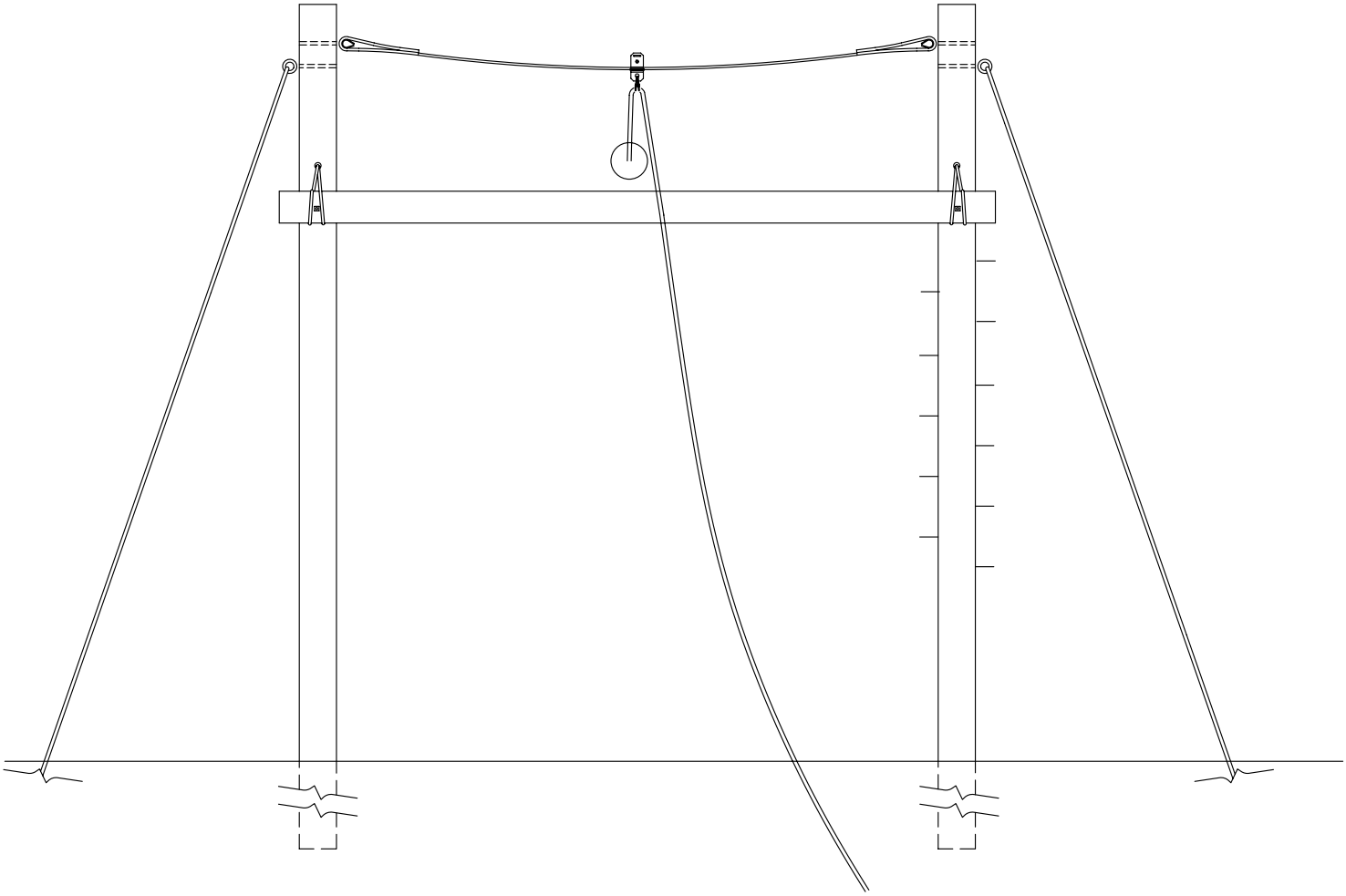
Safety Precautions to Consider

- The belayer must be anchored.
- The participant must wear a helmet and a tied-seat harness or commercial harness.
- A belay must be maintained until a participant returns to ground level or is attached to other protection and says, "Off belay."

Closing the Event

Secure the belay device and disable the balance beam.

BALANCE BEAM



Burma Bridge

Challenge and Objective

Cross the bridge from one platform to another.

Equipment Needed

- Belay system
- Gloves
- Helmets

Setup and Inspection of the Event

1. Rig the Burma Bridge for use.
2. Rig the belay system.

Safety Precautions to Consider

- The participant must wear a helmet and a tied-seat harness or commercial harness.
- The belayer must be anchored.
- A COPE staff member on the platform must ensure that participants hook up their belay lines correctly.
- In a multievent course where participants switch from one belay line to another, each participant must always be attached to at least one belay. The belay must follow the participant to avoid a pendulum effect should the participant slip off the element.

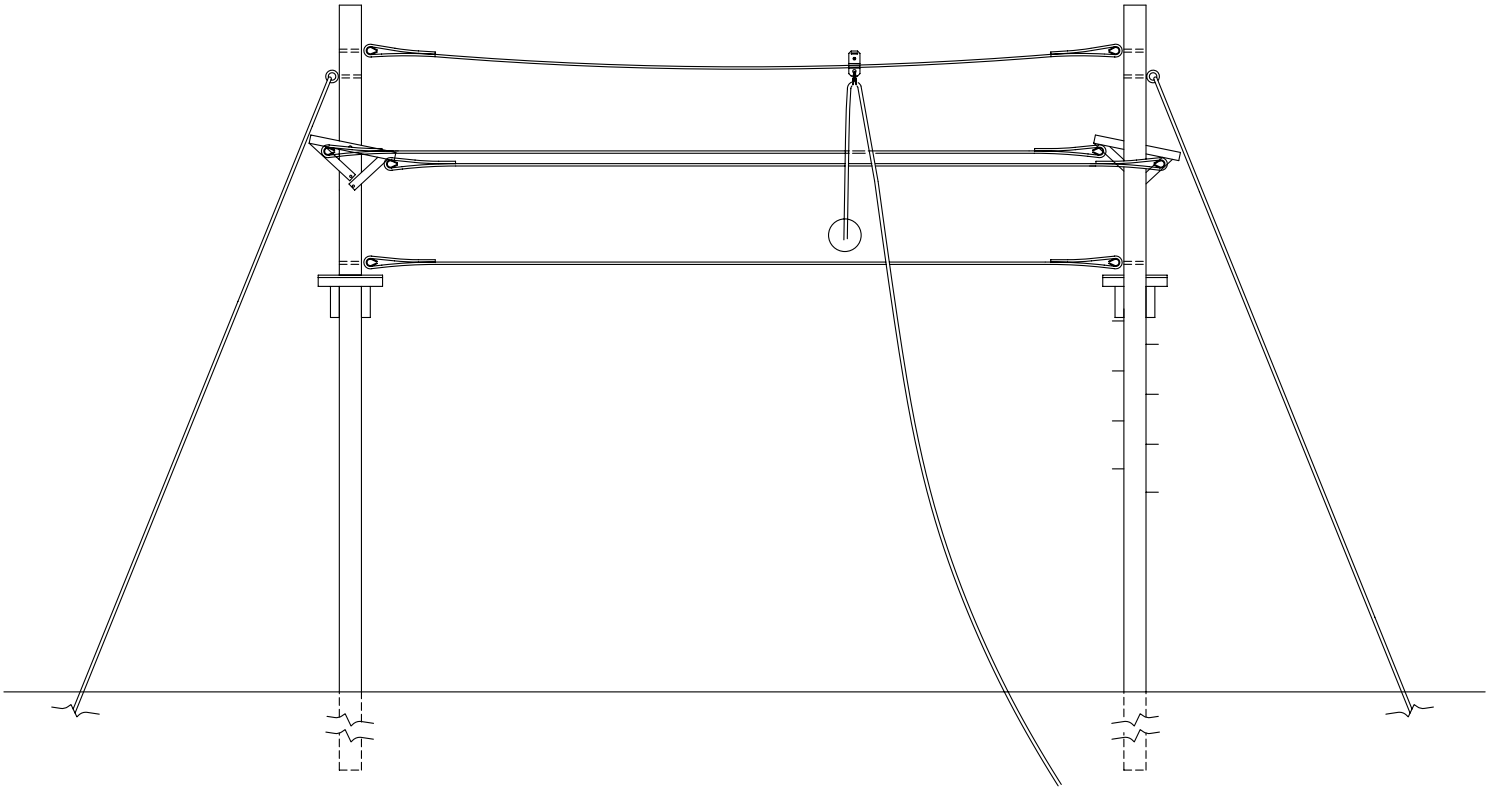
Closing the Event

1. Secure the belay system.
2. Disable the Burma Bridge.

Variations for Accomplishing the Event

- Step foot over foot instead of sliding feet along the cable.
- Walk backward across the cable.
- Hold the hand cable with only one hand.

BURMA BRIDGE



Cargo Net

Challenge and Objective

Climb to the top of a cargo net and then be lowered to the ground by a belayer.

Equipment Needed

- Belay system
- Cargo net and rigging hardware
- Gloves
- Helmets

Setup and Inspection of the Event

1. Rig the cargo net for use.
2. Rig the belay system.
3. Check the belay system and cargo net for their condition, stability, and proper rigging.

Safety Precautions to Consider

- The climber must wear a helmet and a tied-seat harness or commercial harness.
- The belayer must be anchored.
- Place two spotters at the base of the cargo net until a participant has climbed above their reach, or have someone steady a ladder for the climber to access the net, protected by separate spotters.
- If it is necessary to stabilize the cargo net by holding it, have someone other than the spotters do that task; the two spotters must maintain full attention on the climber.
- Keep others away from the area beneath the cargo net.
- Minimize any pendulum effect by keeping the belay ring centered over the participant as the climber ascends.
- Don't use tension on the belay line to help a participant.

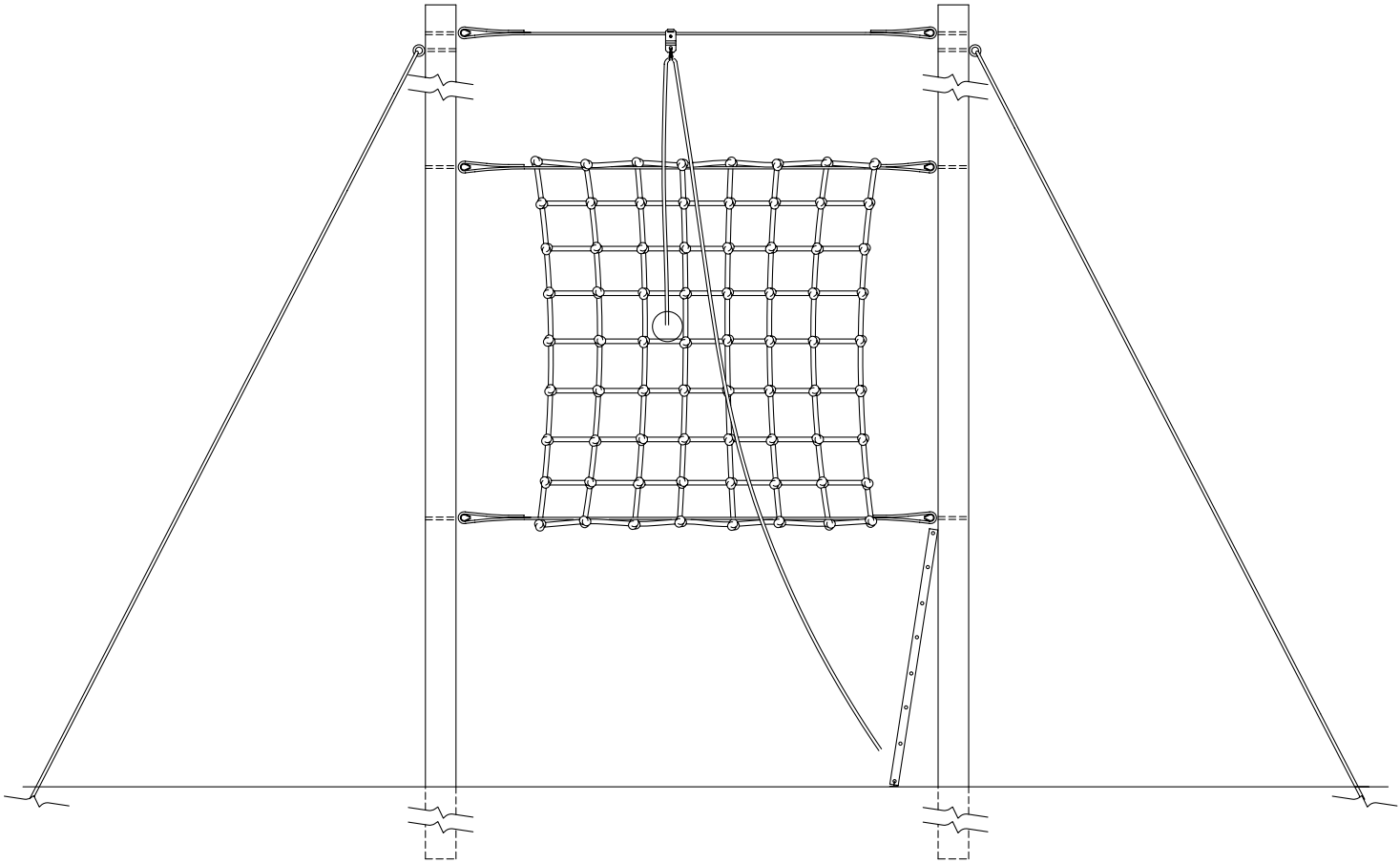
Closing the Event

Disable the cargo net and secure the belay system.

Variations for Accomplishing the Event

- Use the cargo net as an access to the next event.
- Go over the top of the net and climb down the other side.
- Climb the net with eyes closed.

CARGO NET



Caving Ladder

Challenge and Objective

One person at a time, climb to the top of a caving ladder, or climb down from a previous high-course event.

Equipment Needed

- Caving ladder and rigging hardware
- Belay system
- Gloves
- Helmets

Setup and Inspection of the Event

1. Rig the belay system.
2. Rig the caving ladder.
3. Check the belay system and caving ladder for condition, stability, and proper rigging.

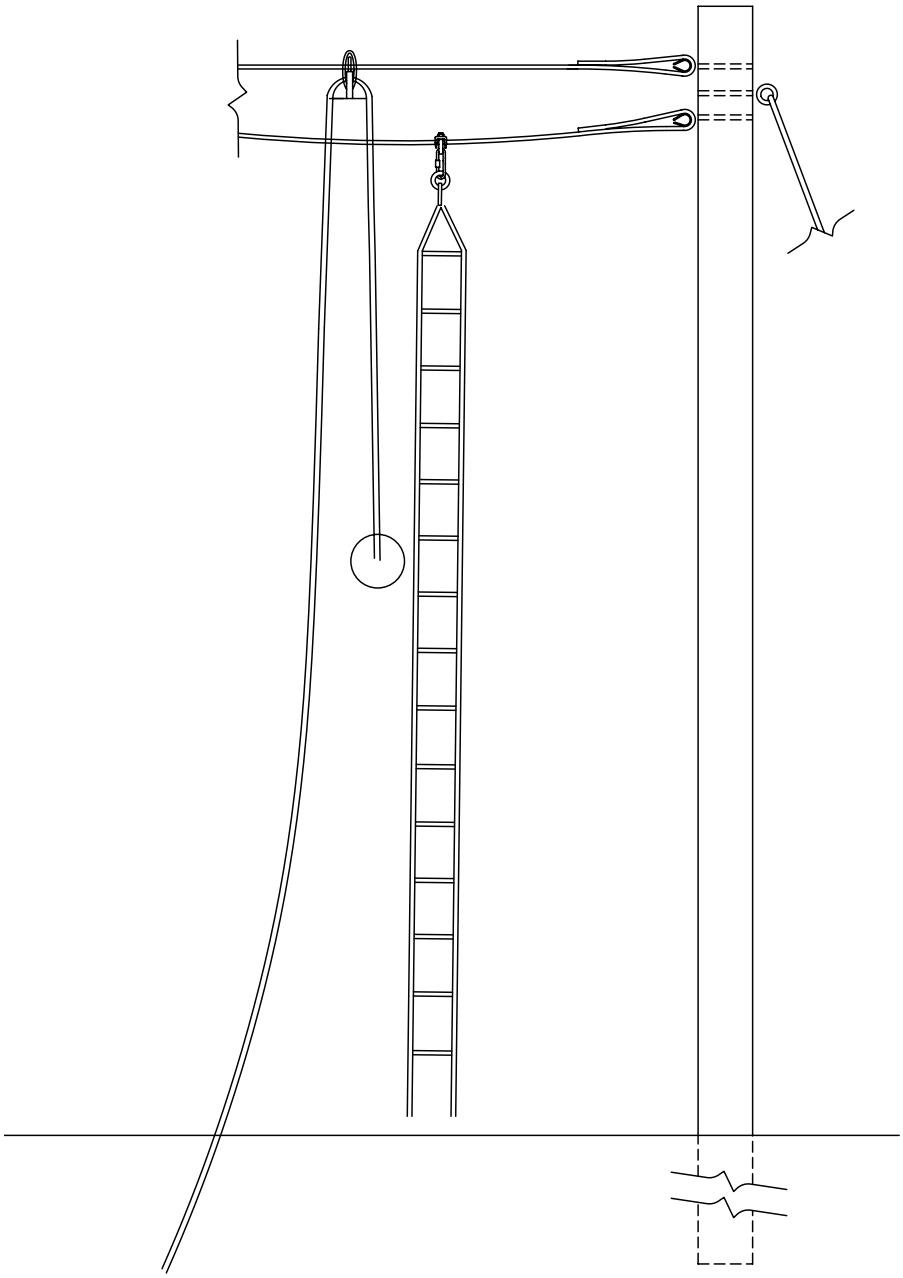
Safety Precautions to Consider

- The climber must wear a helmet and a tied-seat harness or commercial harness.
- The belayer must be anchored.
- Be sure the ladder is not twisted at the start of the climb.
- Do not allow a climber to climb faster than the belayer can take up slack.
- Give extra attention to climbers nearing the top of the ladder and attempting to dismount.

Closing the Event

1. Secure the belay system.
2. Disable the caving ladder.

CAVING LADDER



Centipede

Challenge and Objective

Starting at the bottom of the Centipede, climb as high as possible.

Equipment Needed

- Belay system
- Gloves
- Helmets

Setup and Inspection of the Event

1. Rig the belay system.
2. Check the Centipede for proper rigging.
3. Visually inspect the Centipede for cracks and splinters.
4. Check staples for security and condition.
5. Clear the surrounding area of any debris or overhead hazards.

Safety Precautions to Consider

- The climber must wear a helmet and tied-seat harness or other climbing harness.
- The belayer must be anchored.
- The climber must be belayed throughout the climb.
- Spotters should wear helmets while spotting a climber on the first section of the Centipede.
- Spotters must be aware of swinging Centipede sections.
- Avoid sticking toes or fingers under staples or between sections of the Centipede.
- Avoid catching clothing on staples.

Closing the Event

1. Secure the belay system.
2. Disable the Centipede.

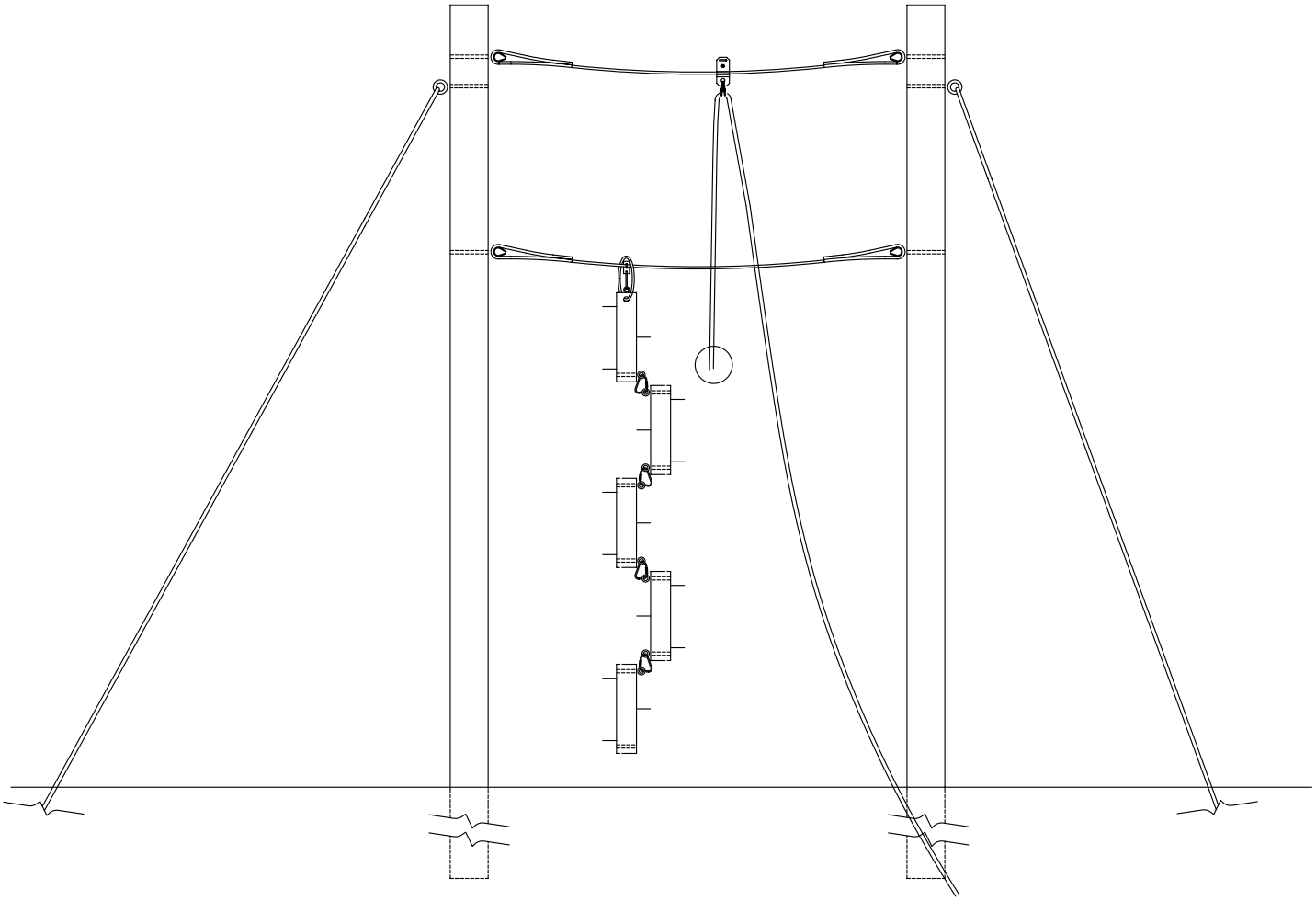
Variations for Accomplishing the Event

- Have the participant keep eyes closed.
- Use the Centipede as an access to other high-course events.
- Instruct climbers to attempt the event one-handed.

Commando Climb

The Commando Climb is designed to enable participants to access other high-course events. It should be made easy to accomplish so that participants are willing to try it.

CENTIPEDE



Confidence Pole

Challenge and Objective

Using a rope, a ladder, or pegs, climb as high as possible up a confidence pole, then jump from the pole and slap a hanging rope.

Equipment Needed

- Belay system
- Rope ladder with rigging hardware or other device
- Chest harness with carabiner
- Helmets
- Gloves

Setup and Inspection of the Event

1. The confidence pole has one belay system, attached to a cable suspended above the pole. The belay system is threaded through a shear reduction block. One end of the belay rope is secured to the participant with a locking D carabiner attached to the tied-seat harness or commercial harness and clipped to the carabiner on the chest harness. The other end of the rope is routed through a just-right descender.
2. Set the belay system.
3. Climb up and down the entire event and check its condition.
4. Check the belay system for condition and security.

Safety Precautions to Consider

- Have two spotters at the base of the confidence pole until a participant has climbed above their reach.
- If a ladder must be stabilized by holding it, have someone other than the spotters do that task; the spotters' full attention should remain on the climber.
- Keep other people clear of the area beneath the confidence pole.
- Belayers must lower participants in a slow, controlled manner to ensure a safe landing.
- Do not allow a participant to jump from the pole if less than halfway up it, since the climber may hit the ground before the belay system fully stops the descent.

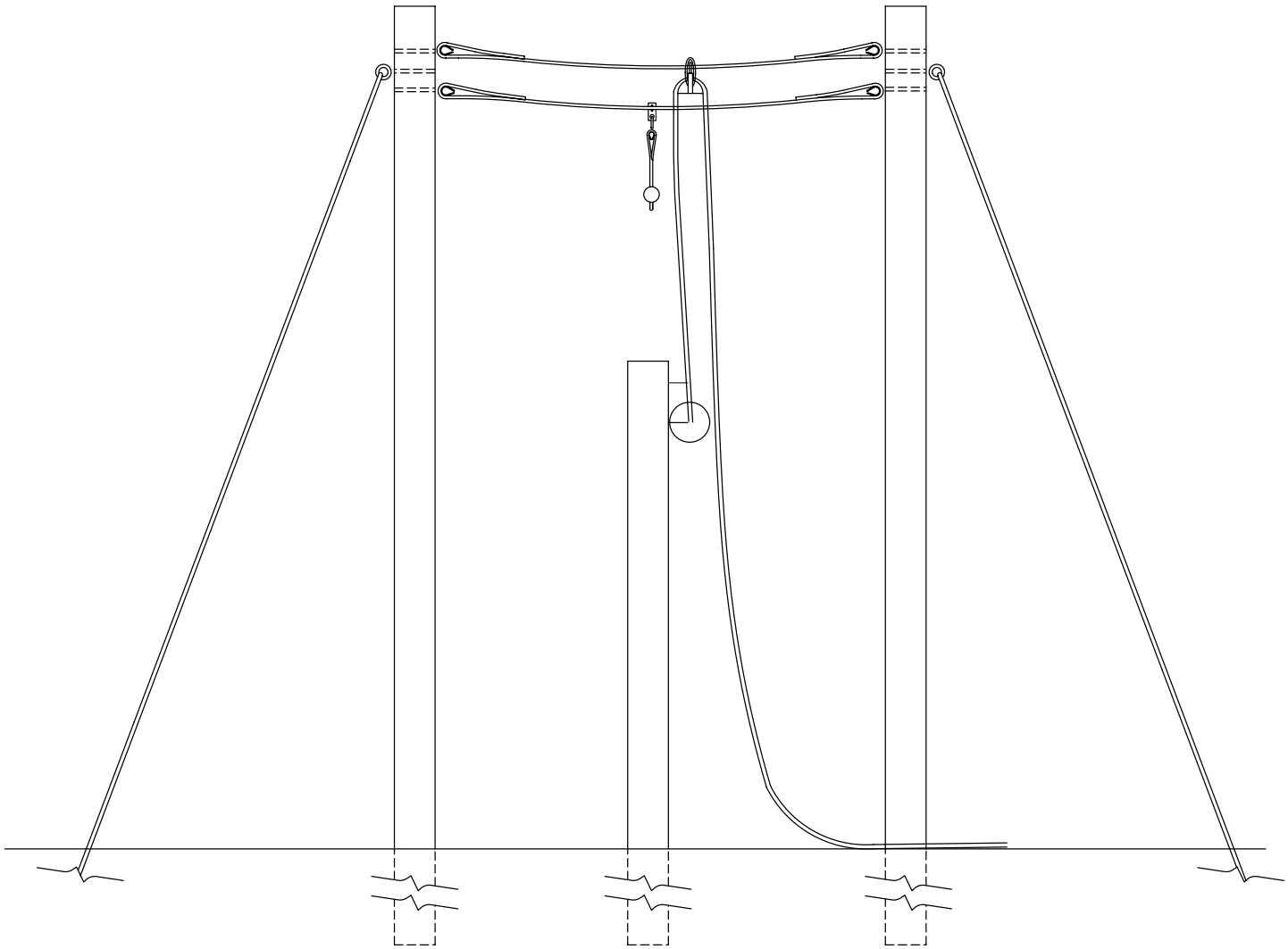
Closing the Event

1. Secure the belay system.
2. Disable the event.

Variations for Accomplishing the Event

Instruct climbers to use only one hand.

CONFIDENCE POLE



Flying Squirrel

Challenge and Objective

Participants use a belay rope to pull a team member off the ground to a predetermined height. This event can be accomplished with a participant who has a mobility disability.

Equipment Needed

- Static rope (½-inch preferred; not a climbing rope, which, because it is dynamic, would stretch too much for this event)
- Pulley
- Carabiners
- Loops of webbing, approximately 2 feet long
- Helmets
- Gloves
- Webbing for tied-seat harness, or commercial harness
- Chest harness

Setup and Inspection of the Event

1. Rig the event.
2. Check the pulley, rope, carabiners, and webbing for condition, stability, and proper rigging.

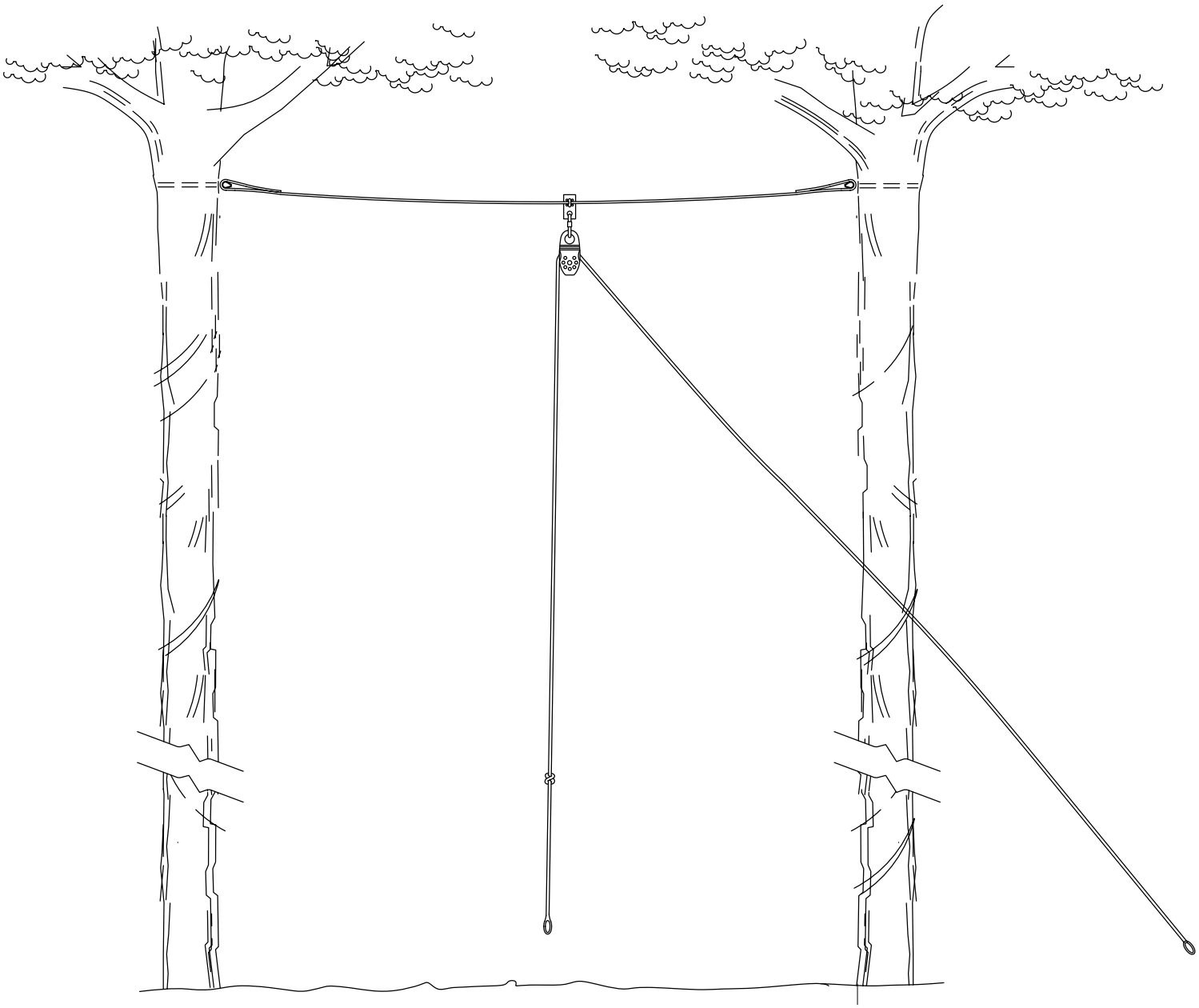
Safety Precautions to Consider

- All pullers must wear gloves.
- The ascender must keep slack out of the rope while on the ground.
- Tie a figure eight knot in the belay rope several feet above the ascender's head to prevent the ascender from being pulled against the pulley.
- Do not attempt this event unless the puller's climbing harness is attached to the rope. Holding the rope with only the hands can be very hazardous.

Closing the Event

1. Secure the belay system.
2. Disable the event.

FLYING SQUIRREL



Gap Step

Challenge and Objective

Step across a 4-foot gap from one elevated platform to another.

Equipment Needed

- Static belay system
- Helmets
- Gloves

Setup and Inspection of the Event

1. Rig the event.
2. Rig the belay system.

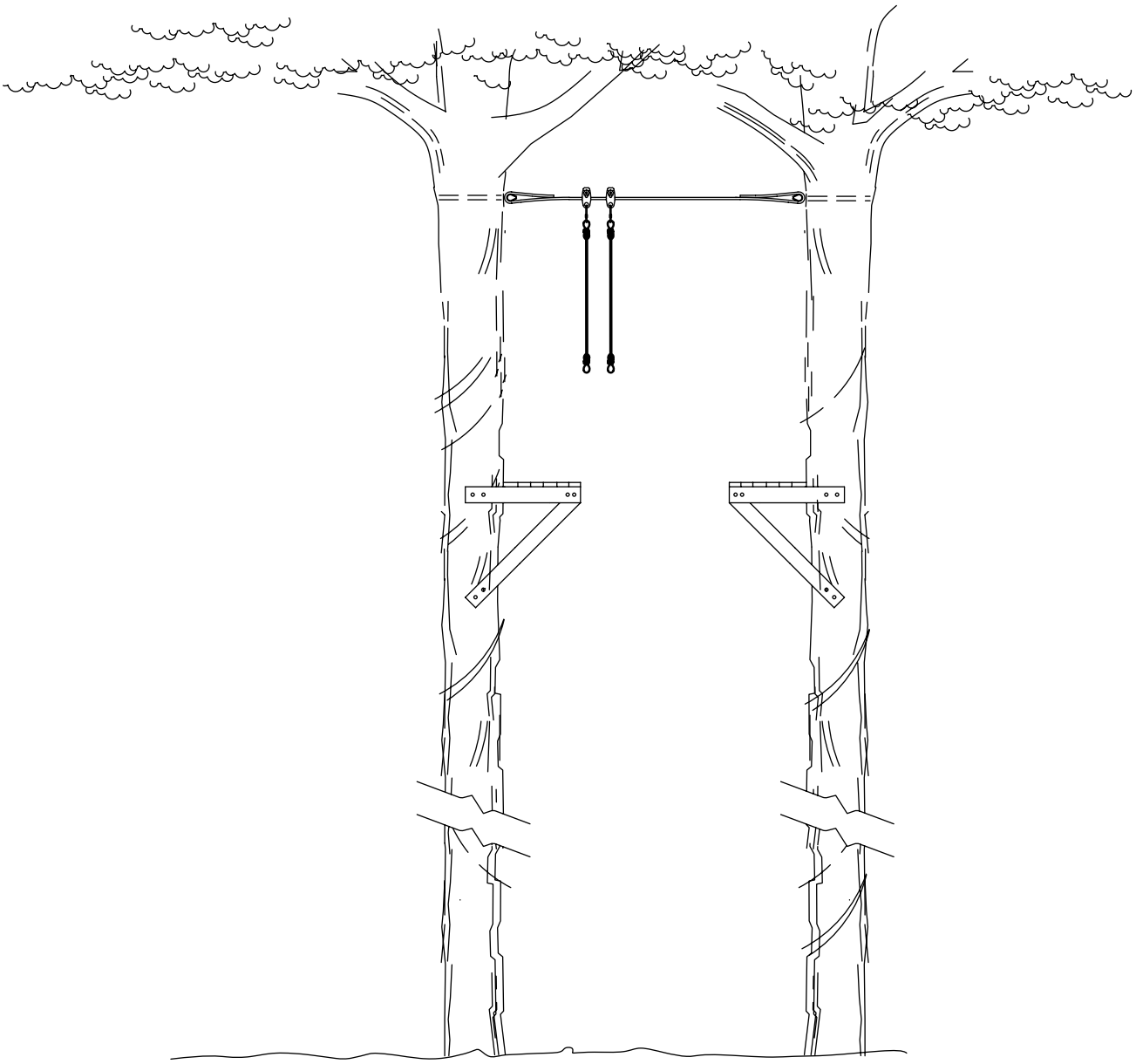
Safety Precautions to Consider

Check all attachments.

Closing the Event

1. Secure the belay system.
2. Disable the event.

GAP STEP



Giant's Ladder

Challenge and Objective

Two participants work together to climb to the top of the ladder.

Equipment Needed

- A separate belay system for each participant
- Helmets
- Gloves

Setup and Inspection of the Event

1. Rig the Giant's Ladder for use.
2. Set up the belay systems.

Safety Precautions to Consider

- If more than one person uses this element simultaneously, each participant must have an independent belay system.
- Spot participants until they are standing safety on the first rung of the Giant's Ladder.
- Belayers must give tension to the participants to preload the belay systems so that climbers will not hit the ground in a fall from the first rung.
- If a ladder must be stabilized by holding it, have someone other than the spotters perform that task; the spotters' full attention should remain on the climbers.
- Before they dismount, instruct participants to keep their hands ready to prevent injury if they swing back toward the Giant's Ladder while being lowered to the ground.

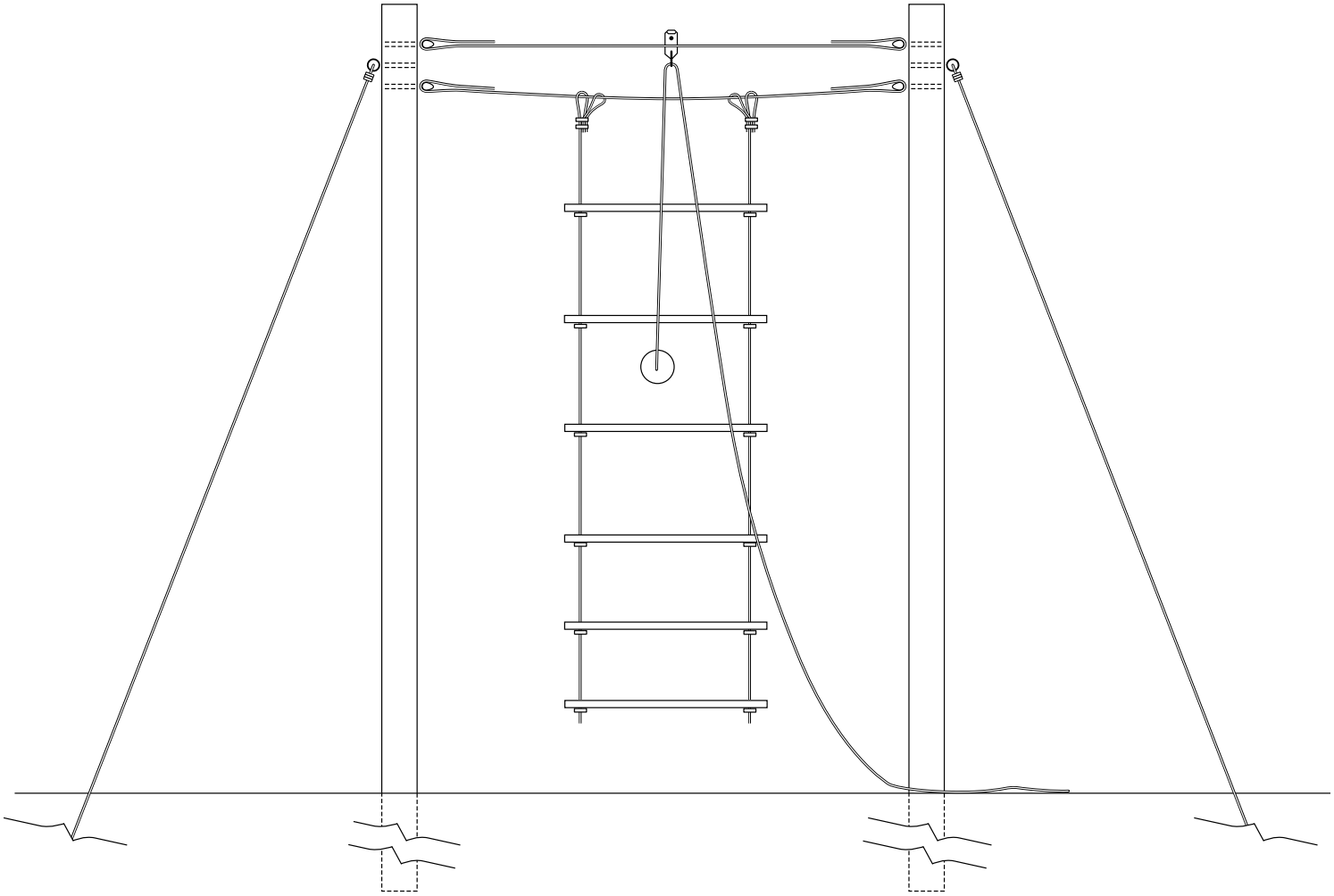
Closing the Event

1. Secure the belay systems.
2. Disable the event.

Variations for Accomplishing the Event

- Complete the activity in silence.
- Have climbers keep their eyes closed.
- Have participants climb the Giant's Ladder individually.

GIANT'S LADDER



Multivine Traverse

Challenge and Objective

Climb a ladder or other device to a cable. Use a series of hanging rope "vines" to traverse the cable to a platform.

Equipment Needed

- Belay system
- Helmets
- Gloves

Setup and Inspection of the Event

1. Rig the multivine event for use.
2. Rig the belay device.
3. Check the multivine event and belay system for condition, stability, and proper rigging.

Safety Precautions to Consider

- Use an acceptable belay device and a locking carabiner attached to the belayer's harness.
- Use the movable human belay—attach the anchor to the belayer with a carabiner clipped into the back of the belayer's harness. The anchor must follow as the belayer moves.
- The combined weight of the belayer and the anchor must equal or exceed the weight of the participant.
- Both the belayer and the anchor must take care not to step on the rope as they move.
- Observers may not be under the cable or near the belay rope.
- The participant must climb up to the cable on the same side of the cable as the belay rope falls.
- Keep light tension on the belay rope throughout the challenge.

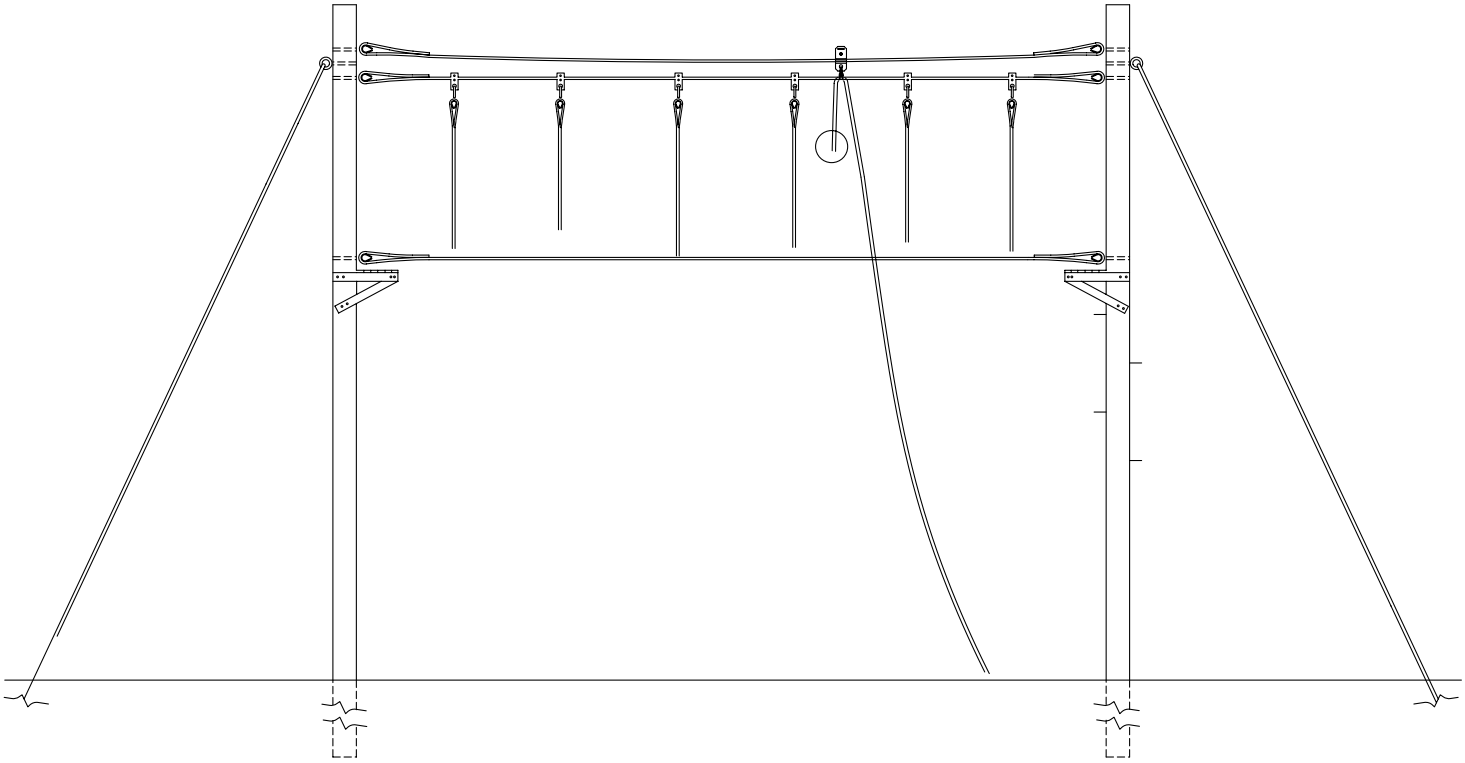
Closing the Event

1. Secure the belay system.
2. Disable the event.

Variations for Accomplishing the Event

- Grab only every other vine.
- Install an occasional bungee cord vine.

MULTIVINE TRAVERSE



Mush-Line Traverse

Challenge and Objective

Walk across two semislack cables while using a suspended rope for balance.

Equipment Needed

- Belay system
- Helmets
- Gloves

Setup and Inspection of the Event

1. Inspect the cables and attachment points.
2. Inspect the balance rope.
3. Rig the belay system.

Safety Precautions to Consider

- Ascend to the event on the same side as the belay rope.
- Maintain near equal weight on both cables and move by sliding the feet along.

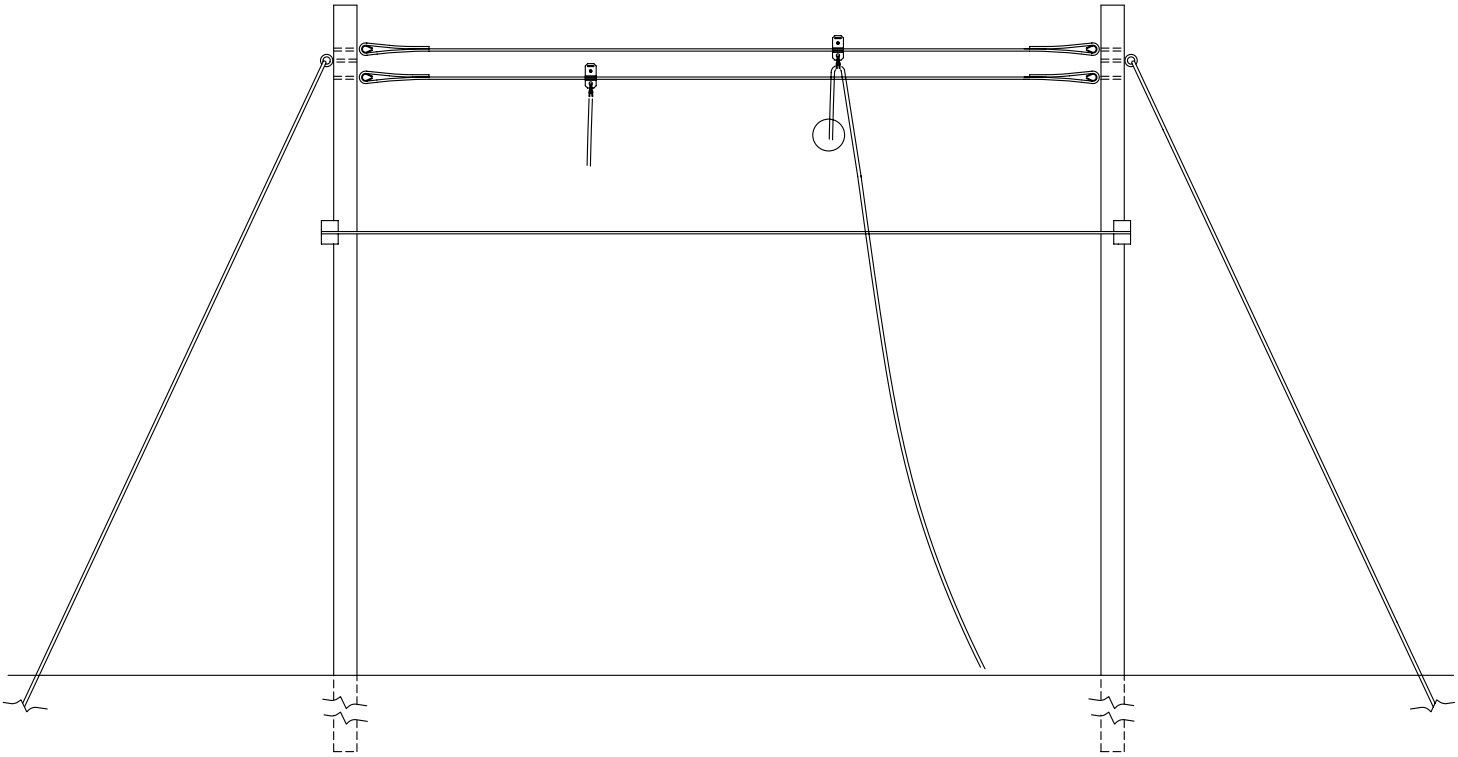
Closing the Event

Secure the belay system.

Variations for Accomplishing the Event

Traverse the event while walking backward.

MUSH-LINE TRAVERSE



Pirate's Crossing

Challenge and Objective

Walk across a taut lower cable while using crossed cables for hand support. The hand cables decrease in usefulness as the participant approaches the midway point of the traverse.

Equipment Needed

- Belay system
- Helmets
- Gloves

Setup and Inspection of the Event

1. Inspect the cables and attachment points.
2. Rig the belay system.

Safety Precautions to Consider

- The participant must climb up to the event on the same side of the cable as the belay rope falls.
- Keep light tension on the belay rope throughout the challenge.

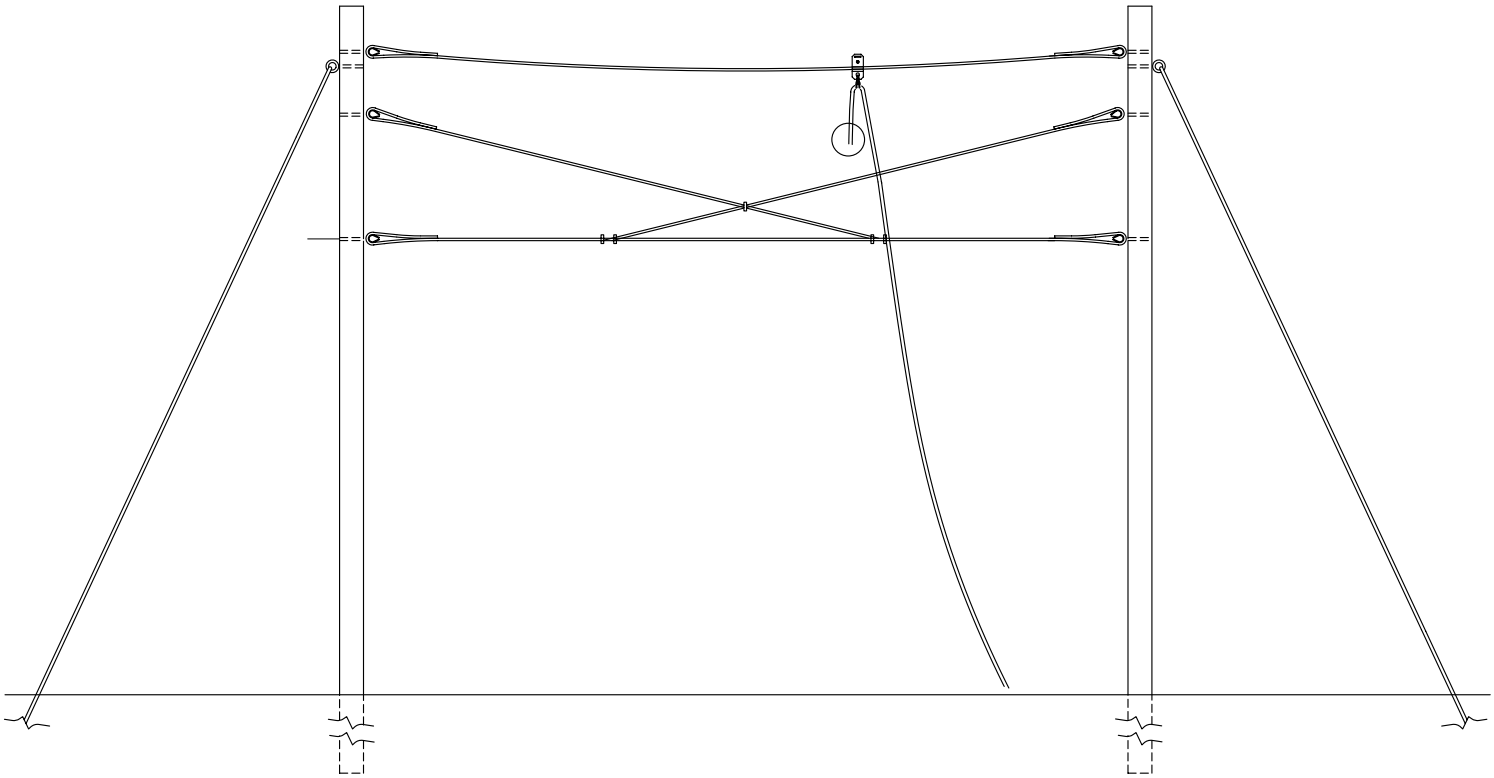
Closing the Event

Secure the belay system.

Variations for Accomplishing the Event

Use crossover steps instead of sliding the feet along the cable.

PIRATE'S CROSSING



Rappel Line

Challenge and Objective

Climb to the top of a platform, then rappel to the ground.

Equipment Needed

- Rappel ropes and rigging hardware
- Helmets
- Gloves
- Belay system

Setup and Inspection of the Event

1. Rig the rappel ropes.
2. Rig the belay system.

Safety Precautions to Consider

- COPE staff sending participants down the rappel system must be secured to the platform.
- Every participant on the platform must be secured to the platform until attached to the rappel rope.

Closing the Event

1. Secure the belay system.
2. Disable the event.

DOUBLE RAPPEL LINE

Rope Climb

Challenge and Objective

Participants grasp the rope with their hands, then lift their legs around the rope and climb as high as possible or until they reach the next event.

Equipment Needed

- Large-diameter rope for climbing
- Belay system
- Helmets
- Gloves

Setup and Inspection of the Event

1. Inspect the connection for security.
2. Inspect the condition of the rope.

Safety Precautions to Consider

- Spot the climber while on the lower portion of the rope.
- Climbers must ascend the rope head first.

Closing the Event

1. Secure the belay system.
2. Remove and store the climbing rope.

Variations for Accomplishing the Event

- Use the climb as an access to another high-course event.
- Climbers may use the hands only for support.

Sky Walk

Challenge and Objective

Using swings, walk from one platform to the next.

Equipment Needed

- Belay system
- Helmets
- Gloves

Setup and Inspection of the Event

1. Rig the event.
2. Rig the belay system.
3. Check the Sky Walk and belay system for condition, stability, and proper rigging.

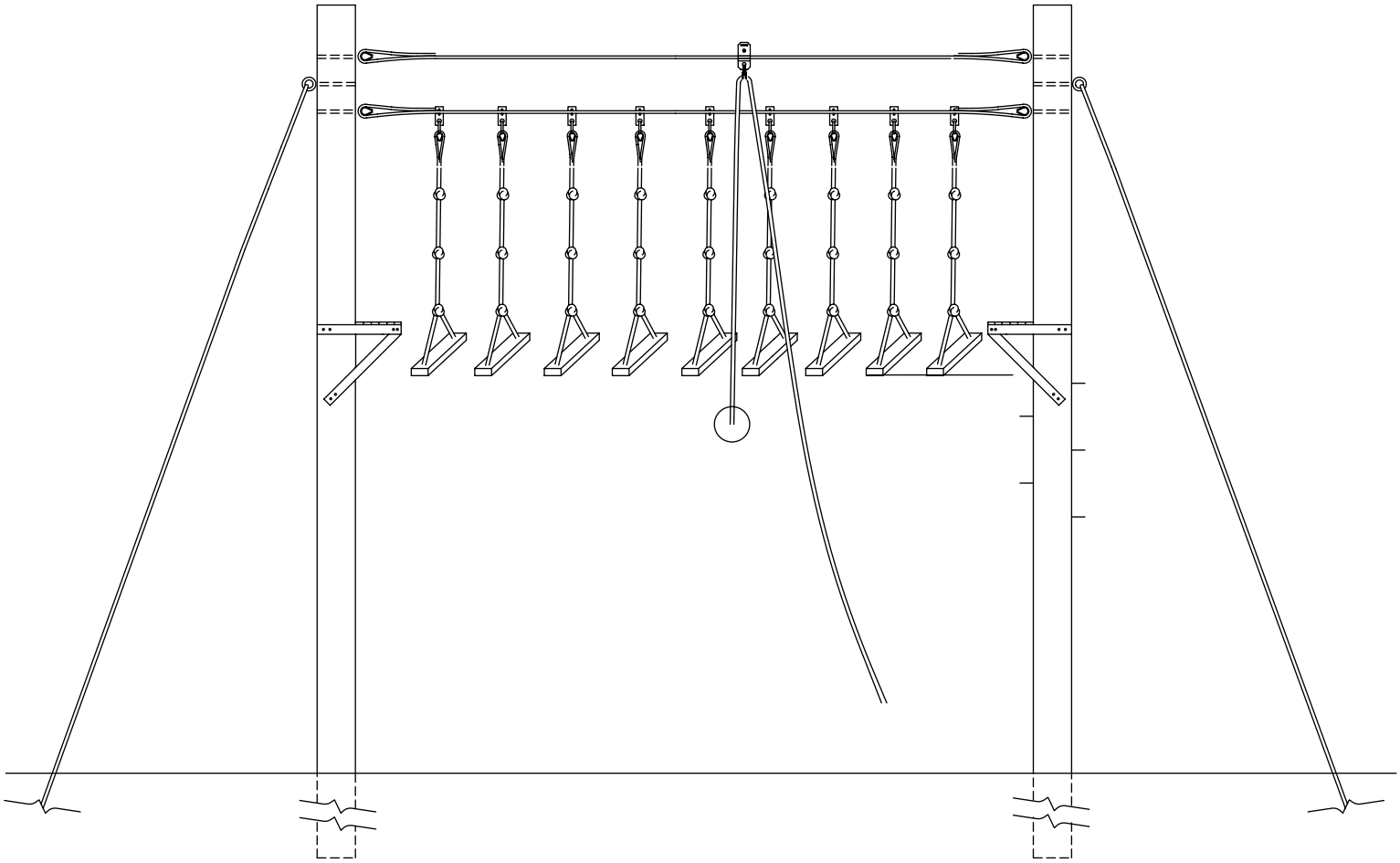
Safety Precautions to Consider

Climbers must be on belay before leaving the ground.

Closing the Event

1. Secure the belay system.
2. Disable the event.

SKY WALK



Slack-Line Traverse

Challenge and Objective

Traverse the length of the slack line, using a static line for balance.

Equipment Needed

- Belay system
- Gloves
- Helmets
- Static line

Setup and Inspection of the Event

1. Rig the event for use.
2. Rig the belay system.

Safety Precautions to Consider

Instruct the participant to let go of the static line in the event of a fall.

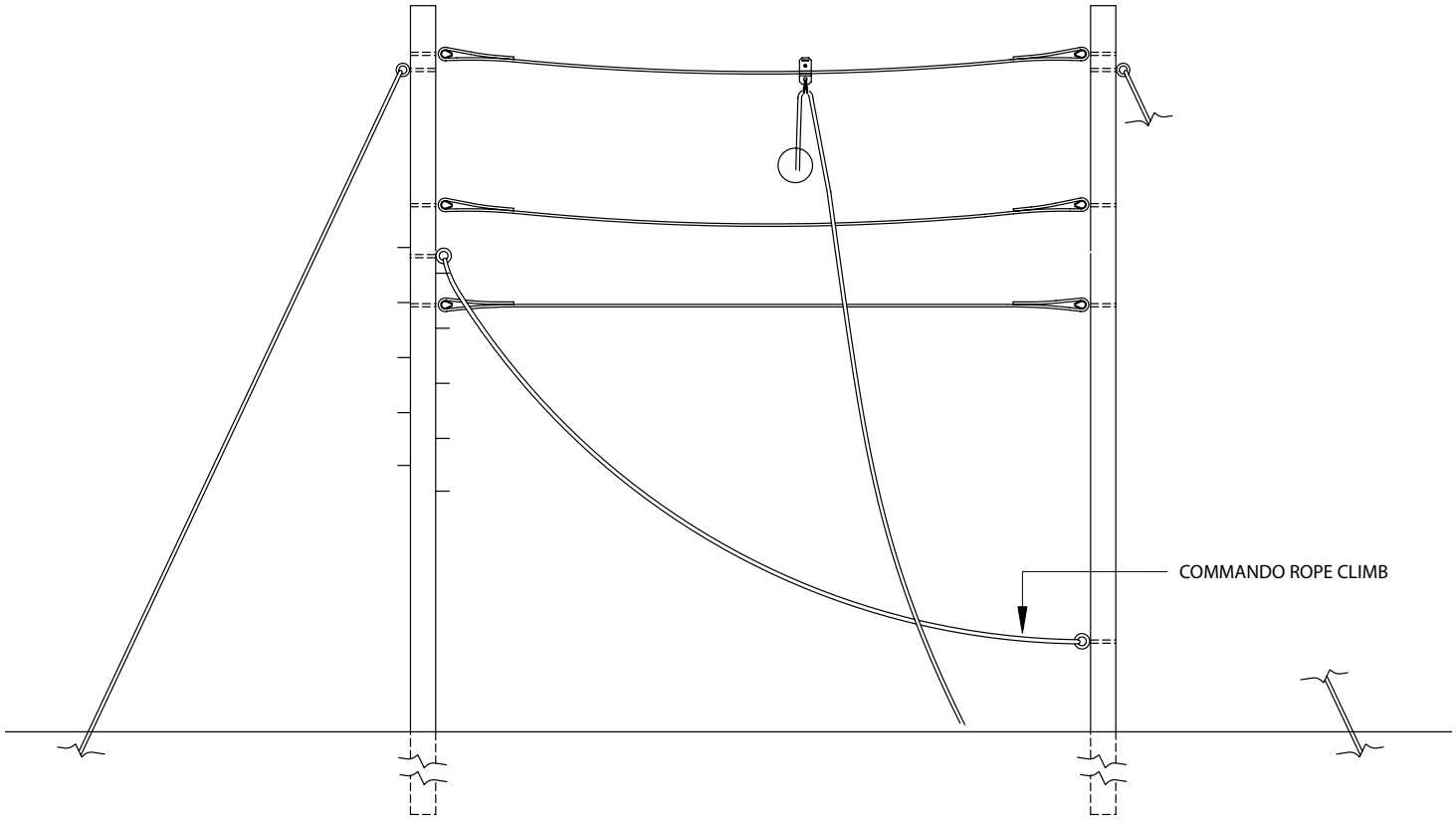
Closing the Event

1. Secure the belay system.
2. Disable the event.

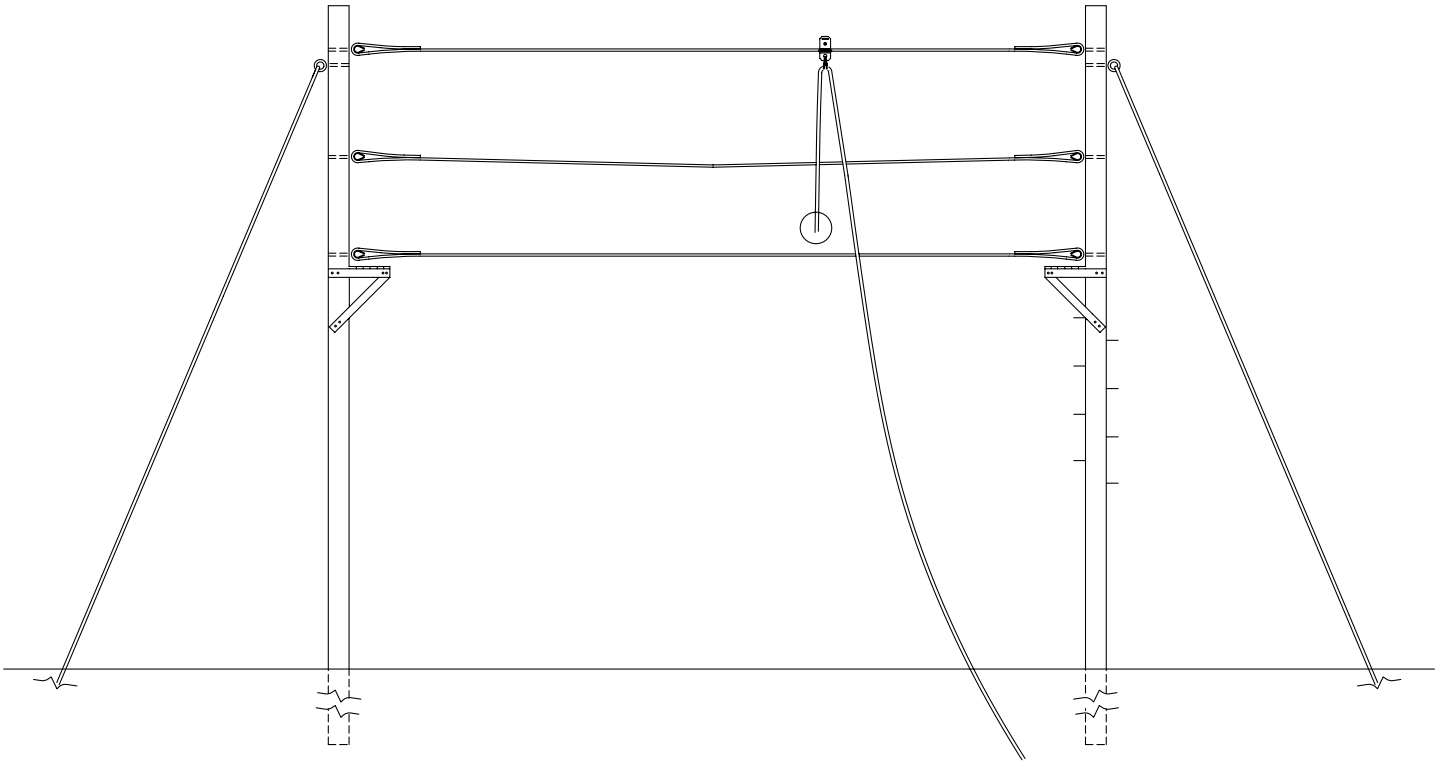
Variations for Accomplishing the Event

- Have participants keep their eyes closed.
- Challenge participants to walk backward.
- Upon reaching the other end, have participants return to the starting point.

COMMANDO ROPE CLIMB TO SLACK-LINE TRAVERSE



SLACK-LINE TRAVERSE



Vertical Playground

Challenge and Objective

Starting at the bottom of the vertical playground, climb as high as possible.

Equipment Needed

- Belay system
- Helmets
- Gloves

Setup and Inspection of the Event

1. Rig the vertical playground for use.
2. Rig the belay system.
3. Check the vertical playground and belay system for condition, stability, and proper rigging.

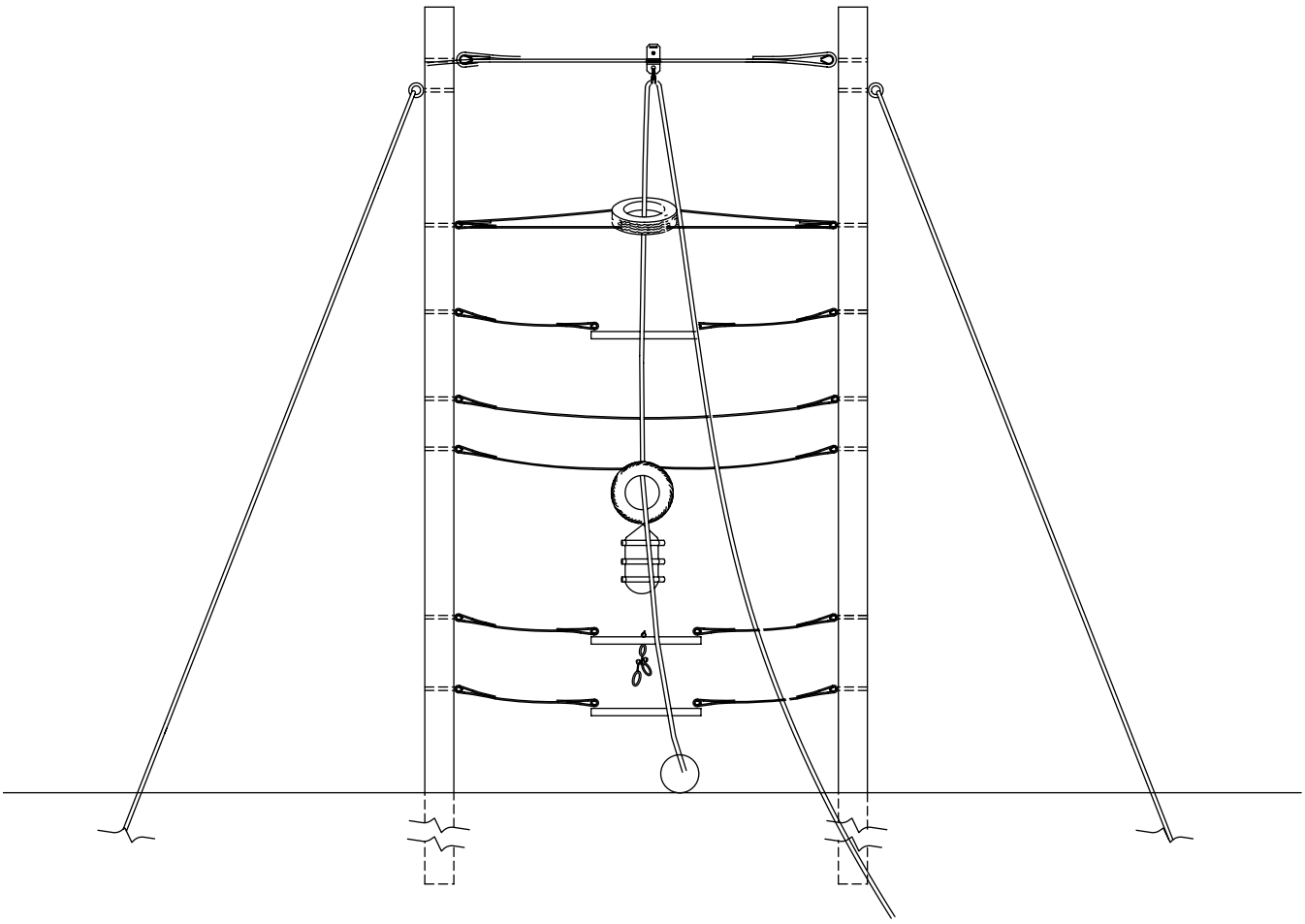
Safety Precautions to Consider

Climbers must be on belay before leaving the ground.

Closing the Event

1. Secure the belay system.
2. Disable the event.

VERTICAL PLAYGROUND



Zip Line

Challenge and Objective

Slide down the zip line from the high end to the low end. Depending on the system design, either gravity or a braking system (bungee brake, zip stop, etc.) will slow the participant at the end of the event, and a static belay system will protect participants as they slide.

Equipment Needed

- A double-wheeled zip pulley
- Carabiners
- One or more tethers
- Static belay system for front attachment to the harness
- Brake system components as required
- Ladder system to unload participants, if needed
- Harnesses
- Helmets
- Gloves

Setup and Inspection of the Event

1. Inspect the event and safety line for proper rigging, condition, and stability, and make sure the activity corridor is clear.
2. Attach the zip pulley to the zip cable.
3. Secure the unloading equipment at the bottom of the zip (ladder, etc.).
4. Complete one full cycle of the zip line prior to sending down the first participant (this could be done by sending a sandbag or weight down the zip line).

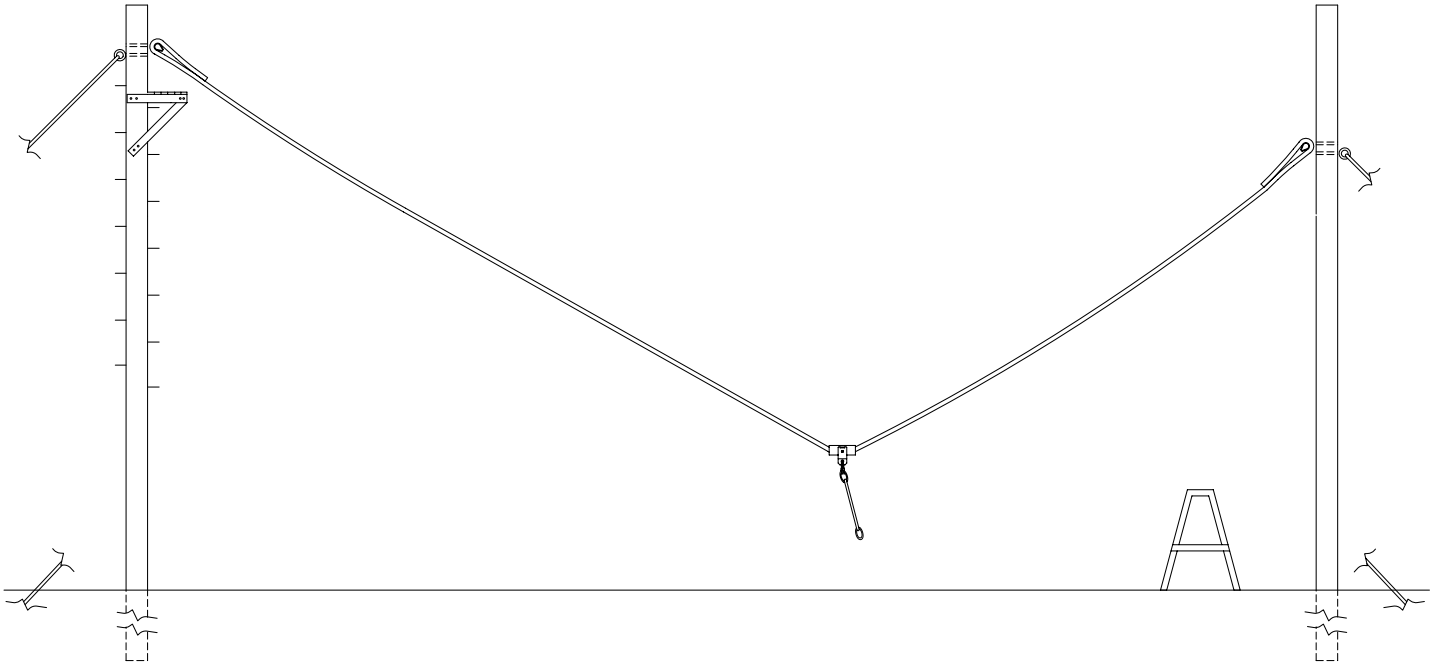
Safety Precautions to Consider

- Staff must always be secured to a safety line.
- Participant must be secured to the zip wire before removing the safety line.
- Ensure that members of the unloading team and observers are clear of the zip wire's path.
- Ensure that no webbing, clothing, or long hair will be caught on the platform or zip wire.
- Participant must wait for permission before zipping.
- Participants should not be allowed to flip upside down while zipping.

Closing the Event

1. Secure the belay system.
2. Remove and store the zip pulley and static belay system.
3. Secure and store the unloading equipment.
4. Disable the ascent to the zip line.

GRAVITY-BRAKE ZIP LINE



CHAPTER 22

Group Development

In his book *The 17 Indisputable Laws of Teamwork*, John Maxwell recalls observing the following definition of a team on a T-shirt: "My idea of a team is a whole lot of people doing what I tell them to do." Unfortunately, too often this is how most people view a team—one individual is the leader and he or she tells everyone else what to do.

One of the goals of COPE is to take a group of individuals and develop them into an effective team. This is accomplished by providing them the opportunity to enhance their communication, planning, decision-making, problem-solving, and leadership skills while at the same time developing a sense of trust in one another. This will help to enhance their self-esteem, as well as help to increase the effectiveness of the team.

A group of individuals will develop into a more effective team when they are working together to achieve a common goal or purpose for which they hold one another accountable.

Some key points to look for in effective teams:

- Members have a shared interest in achieving the goal.
- The work cannot be accomplished independently by individuals.
- The team members are responsible for the work and share in the results.
- There is a commitment to a common approach to achieving the goal.

In COPE, we create opportunities for groups of individuals to become members of effective teams by giving them challenges:

- That progress from easy to more complex
- That require various levels of creativity
- In which the goal(s) is not clearly defined
- Where limited resources must be used efficiently
- That require cooperation between the members of the group
- For which one individual does not have the knowledge necessary to resolve the problem or achieve the goal

We know that a group has become an effective team when the members:

- Understand the goal and why they need to achieve it
- Understand how they fit into the big picture
- Are able to develop a plan
- Are able to measure their progress and evaluate their activities

- Develop a common set of rules, values, and ethics that establish trust and allow the members to take risks to achieve the goal
- Celebrate their success

To become an effective team, individual members of a group need to progress through a series of stages that transforms them into a team. This process is known as group development and has been studied for a number of years, resulting in several theoretical models.

STAGES MODEL

One of these models was developed by Bruce Tuckman in 1965 and further refined in 1977. Tuckman's Stages model complements the COPE program because it addresses two aspects of group development—interpersonal relationships and task behaviors—that are addressed in the goals of COPE. Tuckman's model has four basic stages: forming, storming, norming, and performing.

Forming

During the forming stage, members explore the boundaries of acceptable group behavior as they transition from individual to team member. Their behavior is driven by a desire to be accepted by the others and to avoid controversy or conflict.

During forming, individuals will feel:

- Pride in being chosen as a member of the team
- Excitement, anticipation, and optimism about the future
- Initial, tentative attachment to the team
- Suspicion, fear, and anxiety about the task ahead

Individuals exhibit these behaviors:

- Behave independently and focus on themselves
- Avoid serious issues or feelings
- Attempt to define the task and decide how it will be accomplished
- Decide what information they need to gather
- Determine acceptable team behavior and how to deal with team problems; establish team ground rules
- Wait to be told what to do and direct most communications to the team leader
- Because conflict is avoided, not much is actually accomplished

Leaders during forming want to build trust and confidence by:

- Helping members get to know one another
- Providing clear direction and purpose
- Involving team members in developing plans, clarifying roles, and establishing ways of working together
- Providing the information and structure the team needs to get started
- Helping members determine what is expected of them, what is in it for them, and what each member's purpose is on the team

Storming

During the storming stage, members begin to realize the task is different from what they originally thought and more difficult than they imagined, and they become testy, anxious, or overzealous. The storming stage is necessary for the growth of the team but can be unpleasant, especially for individuals who want to avoid conflict. Many teams, especially those with immature members, may never leave this stage.

During storming, individuals will:

- Feel frustration and resistance to tasks and methods of work different from what they are comfortable doing; comfort zones of group members need to be addressed so that they move from comfort to growth but are not forced into panic mode
- Have sharp fluctuations in attitude about the team's chances of success
- Experience anxiety about or withdraw from conflict

Individuals exhibit these behaviors:

- Argue even when they agree on the real issue
- Become defensive and competitive, splitting into factions and "choosing sides"
- Establish unrealistic goals and express concern about excessive work
- Perceive a "pecking order," creating disunity, increased tension, and jealousy
- Withdraw either physically or psychologically

Leaders will want to build self-direction by:

- Encouraging tolerance
- Resolving issues of power and authority
- Developing and implementing agreements about how decisions are made and who makes them
- Developing a leadership role that will allow the team to become more independent by encouraging individuals to take on more responsibility
- Using established ground rules to guide team behavior
- Ensuring equal opportunity to participate

Norming

During the norming stage, members reconcile competing loyalties and responsibilities by accepting the team, the team's ground rules, and their role on the team and working toward the mutually agreed upon goal and plan.

During norming, individuals feel:

- A sense of team cohesion and a common spirit and goals
- Acceptance of membership on the team
- Relief that it seems everything is going to work out

Individuals exhibit these behaviors:

- Laugh, joke, and attempt to achieve harmony
- Experiment with ways to raise and discuss differences of opinions effectively
- Confide in one another and share personal problems; discuss the team's dynamics; become friendlier
- Increase collaboration
- Express criticism constructively
- Maintain team ground rules and boundaries ("norms")

Leaders will want to build cooperation by:

- Fully utilizing team members' skills, knowledge, and experience
- Encouraging and acknowledging members' respect for one another
- Encouraging collaboration between members
- Referring the team to established ground rules as a guide for group behavior
- Modifying the ground rules as needed
- Asking the group to determine how members can effectively handle conflict and develop a cooperative spirit

Performing

During the performing stage, members of the team have settled into their relationships and expectations, and they can consistently evaluate the problem, develop a plan, and accomplish the task with a minimum of conflict. The conflict that does occur is expected and is allowed, provided it follows the team rules or standards.

During performing, members:

- Have better insights into personal and group processes
- Have a better understanding of one another's strengths and challenges
- Experience satisfaction at the team's progress
- Form a close attachment to the team

Individuals exhibit these behaviors:

- Create constructive self-change
- Prevent or work through group problems

Leaders will want to build an openness to change by:

- Helping the team to continually improve its methods and procedures to have members become more collaborative
- Helping the team celebrate achievements or successes

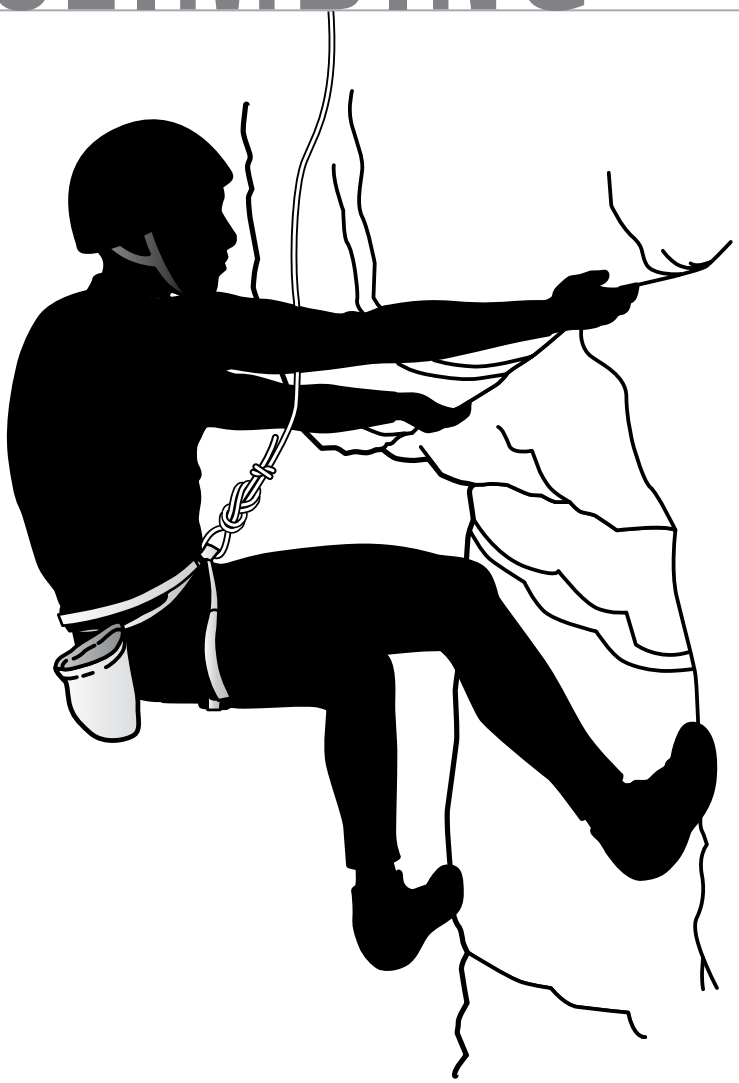
As the group participates in the COPE program, members will go through each of these stages at every activity or challenge you give them. Early in the day,

they will spend more time in the forming and storming stages. As the day progresses, they will spend more time in storming and norming. If they have become a team, by the end of the day they will be spending a majority of their time performing. You may not realize they went through the forming, storming, or norming stages during particular activities.

As a cautionary note, some teams may never get out of the forming and/or storming stages. As a facilitator, you should be prepared with processing questions to help them through this stage. Additionally, it would be helpful to have prepared some "easier tasks" that you can go back to so they can become successful with the earlier stages of development.

PART THREE

CLIMBING



CHAPTER 23

Site Selection and Management

Not many years ago, climbing was almost always practiced in the mountains. Today, however, climbing areas can be found throughout the country. Among the most popular kinds of sites are natural rock faces and artificial walls.

NATURAL ROCK FACES

Steep cliffs, mountainsides, and canyon walls have long attracted climbers to find handholds and footholds on rock faces. Trees, boulders, and rock outcroppings serve as anchor points for belay and rappel ropes.

Some of these rock faces are in Scout camps. Many others can be found in state and national parks or other public lands, as well as on private property. Whatever the case, all climbers must secure permission from property owners or land managers before setting out on a climb and then follow the requirements of a public agency or private landowner.

ARTIFICIAL WALLS

In recent years, outdoor climbing walls have been built in some Scout camps. These walls are easily accessible and provide a great learning environment for Scouts. Skills are developed that can possibly lead to climbing at a natural site.

A growing number of schools, climbing clubs, and climbing gyms have indoor walls that challenge climbers from beginners to experts. Handholds of different shapes bolted to the walls create climbs of varying difficulty and interest. The handholds can be moved around to provide climbers with fresh routes. These holds will occasionally need to be retightened. Belay ropes anchored above the walls allow climbers to be top-roped as they practice their moves.

Scouts attending summer camp may enjoy climbing and rappelling outdoors on towers that offer a number of faces with routes of differing degrees of difficulty. Permanent or temporary walls established outside or indoors may be fairly high, up to 30 feet or more. Other walls are horizontal rather than vertical, providing climbers with opportunities to practice traverses and bouldering moves while ascending no more than six feet above the ground. Provision should be made to monitor or disable climbing facilities to a height of 12 feet when not in use.

PORTABLE CLIMBING STRUCTURES

Portable climbing structures may be appropriate for use at Scout shows, camporees, or anywhere that a fixed structure or natural climbing site is unavailable. If mobile climbing walls are used, the following items must be considered and implemented:

- Manufacturer's recommendations
- Appropriate state and local laws
- Applicable climbing and COPE standards
- Age-appropriate use of the facility
- Replacement schedule for cables and equipment
- Anchoring and wind resistance

It is recommended that participants not be charged a fee because this might incur additional regulations.

Units participating in any climbing activity that includes portable climbing structures must conduct their activities according to the guidelines laid out in Climb On Safely. District and council activities involving any climbing activity that includes portable climbing structures must be conducted according to the National Camp Accreditation Program standards.

SELECTING A NEW SITE FOR A BSA CLIMBING/RAPPELLING PROGRAM

Choosing an outdoor location as the site of a climbing or rappelling program requires a good deal of thought and the input of knowledgeable people. Taking the following into consideration will help ensure that a site is challenging, safe, and worthwhile.

- Engage the assistance of local rock-climbing authorities or BSA climbing directors from other areas who have extensive, safe climbing experience and an understanding of the program the BSA offers young people. Rock-climbing organizations may also be able to provide advice. Most climbing locations have materials describing climbs and routes available.
- Avoid areas where rock is unduly fractured, brittle, loose, slippery, or crumbly. Rock that is easily dislodged will present a hazard to climbers, rappellers, and bystanders.
- The site should be reachable by road or trail, or should have other quick access to emergency aid within a reasonable time.
- A reliable form of emergency communication should be available. Cellphones may not have a good signal in some climbing areas.
- Participants in warm, arid regions may be more comfortable on climbing and rappelling faces oriented toward the north or east, out of direct afternoon sunlight.
- Depending on the number of participants expected during normal sessions of the program, establish climbing routes of 30 to 60 vertical feet. If regular operations will involve a large number of climbers, shorter routes will allow participants to complete their ascents more quickly. Several routes of varying difficulty are preferable, allowing instructors to match the routes for a day with the experience level and abilities of participants, or to encourage participants to select the route they most want to test.
- The incline for climbing should be a 40 to 80 degree slope, with 60 to 70 degrees slope being about right. There should be plenty of holds for hands and feet, preferably a variety of cracks, ledges, and protrusions. Relatively smooth surfaces are to be avoided for beginning climbers.
- A rappelling pitch should have a reasonably constant slope from top to bottom. Avoid routes with large ledges or benches that could interrupt constant tension on the rappel rope or interfere with the ability of instructors to observe and monitor rappellers throughout their descents.
- A rappel should have an easily accessible starting point where each rappeller can safely begin the descent. The first 5 feet of a rappel are the most challenging for beginners.
- To ensure a feeling of adventure and accomplishment, a rappel route should have a vertical length of at least 30 feet. Descents require only a few moments for each participant to complete, so a program can operate efficiently even with long rappels.
- Every route for climbing and rappelling must have a fail-safe anchor system. This might consist of large healthy trees, boulders, rocks, or artificial pieces of protection. All anchor systems and life safety systems must be constructed by a qualified instructor or director. Some climbing sites have bolts and hangers that can be used to construct an anchor system. These bolts and hangers are specifically designed for climbing purposes and must be installed by a qualified person approved by the council's climbing and rappelling committee. (For more on anchoring, see chapter 26, "Anchoring.")
- There must be sufficient area above each route to accommodate at least three people comfortably—a belayer, an instructor, and a climber or rappeller. A route on which a belayer is at the bottom of a climb and will lower a top-roped climber to the ground does not require as much space at the top but does need enough room that an instructor can safely install anchoring systems each day before participants begin to climb.
- If participants will climb and then rappel in sequence, establish a safe path from the top of the climb to the top of the rappel. The path should not run next to the edge of a cliff; if it does, install a safety line and require participants to clip into it before unclipping the climbing belay rope. A safety line keeps participants out of harm's way when moving to the next activity. Upon reaching the rappel site, complete rappel hook-up before unclipping the safety line.

- Belayers should be anchored or tethered whenever there is a risk of a potential fall.
- If allowed, remove any trees, limbs, shrubs, or other obstacles that could interfere with climbing, rappelling, or belaying without doing significant harm to the vegetation or geologic formations. If that is not possible, choose another site. Follow the Leave No Trace principles.
- Place routes so that participants can be observed from below throughout all climbs and rappels, and preferably from above as well.
- Consider where bystanders and participants waiting their turns to climb will gather. The gathering area must be well removed from the line of fall of rocks or climbing equipment. Unless they are belaying or spotting, keep bystanders out of the fall zone below the climb or rappel.
- Establish a secure place to store ropes and hardware. Whether near the site or at some other location, the equipment cache must be protected from rodents, weather, and vandals.
- Toilet facilities should be convenient, both for the comfort of participants and for the protection of the environment.
- The site should have a source of safe drinking water. Otherwise, instructors and participants must bring their own water.

EVALUATING THE SAFETY OF A CLIMBING/RAPPELLING AREA

The temperature, lighting, and stability of an indoor climbing area can be controlled as easily as in any sports gym. At outdoor climbing areas, however, conditions will vary. Before beginning a day's activities, instructors should take a few minutes to check the overall status of an outdoor climbing/rappelling site and note anything that might have an impact on the safety and experience of participants. Here are some factors to consider.

Weather

Check the weather forecast before departing for the climbing site. Have an alternate plan for when weather conditions make climbing unwise. If it is raining, stay off rock faces. Water can make climbing surfaces slippery. Wet ropes can be difficult for belayers to hold, and climbing equipment that has become damp must be dried before going into storage.

Lightning can be a serious concern, especially in mountainous areas. Afternoon storms may develop quickly, catching climbers unprepared if they are not vigilant. Many climbing/rappelling program sites are near ridge tops that may be targets of lightning strikes; lightning can also hit locations deep in valleys. Carabiners and other metal climbing hardware may attract electrical currents from lightning, as can wet rope. Whenever there is bad weather or lightning in the area, immediately suspend all climbing/rappelling activities and retreat to a safe location.

At least one leader on each climbing trip should have taken the BSA's Weather Hazards online training.

Rock

The kind of rock found in an area can make a big difference in the safety of climbers. In general, hard rock, such as granite, offers climbers the best surfaces. Softer rock or rock that is fractured or layered, such as shale, may crumble or slide away under a climber's weight. Seek advice from someone in the area on the best climbing sites.

Look above the climbing area to see what might be waiting to fall. Stay away from faces that are beneath leaning pinnacles or boulders. Listen for the sound of small stones bouncing down the rock; this is an indication that there is unstable material above.

CHAPTER 24

Environmental Conditions

Climbing leaders should carefully consider environmental conditions when planning for and during climbing activities. Weather forecasts and reports from previous groups visiting the area are valuable for planning, but these cannot always be relied on for accuracy, so constant vigilance is needed throughout the trip.

IDENTIFYING HAZARDS

Possible hazards commonly associated with climbing and rappelling include the following.

Potential Environmental Hazards

- Rain, wind, heat, and cold
- Poor condition of the rock face or artificial structure upon which climbing/rappelling will be practiced
- Failure of equipment or anchoring points
- Animals and insects

Potential Human Hazards

- Participants physically or mentally unprepared for the challenge
- Faulty judgment, improper training, or ignorance on the part of participants, directors, or instructors
- Unreasonable expectations by participants, directors, instructors, parents, group leaders, and others

CHAPTER 25

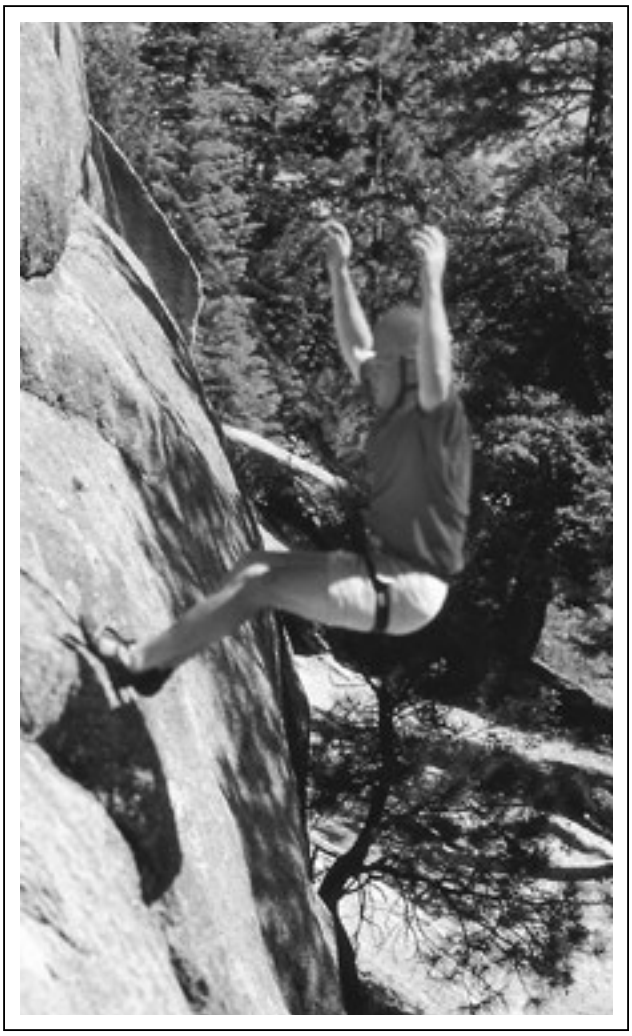
Rock Climbing, Bouldering, and Aid Climbing

On a climbing wall or tower, the holds are 12 to 18 inches apart and are very obvious to a climber. When that same climber first climbs on a natural face, he or she might think "Where are all the holds?" The answer is "The holds are everywhere." Climbers can use every part of the rock in ways that can't be duplicated on a wall or tower.

For many participants in BSA climbing/rappelling activities, there is nothing quite so challenging and thrilling as tying in to a climbing rope and making their first ascent of a steep face. The power of that experience can affect them on many levels—increasing self-confidence, overcoming personal barriers and fears, gaining skill, and taking on new responsibilities. In addition, they will discover that climbing can be downright fun.

To maximize the climbing experience and minimize the risks inherent in the sport, instructors should thoroughly prepare participants before allowing them to go on the rock. That can include a short introduction to cover the basics of using climbing's verbal signals, of being belayed, and of employing a three-point stance. Instructors can also demonstrate basic holds for the hands and feet and discuss what participants should do during and after a fall.

A portion of the introductory segment at a climbing site must include a few minutes of stretching to allow participants to loosen up and prepare for the rigors of the activities ahead. Novices may be further encouraged to be aware of the ways in which their bodies move as they walk on flat surfaces. If the terrain allows it, instructors can have participants do the same on gentle inclines and then more steeply angled rock. That will also allow them to experience the gripping ability of shoe soles, the use of small nubs and edges for holding body weight, and the incorporation of the hands to form a three-point stance, the foundation of all climbing.



Instructors working with a group new to climbing should explain how a belay works, mentioning that dynamic rope will stop falls gradually rather than all at once. Participants who are especially concerned about their safety might find their fears allayed if instructors also show them how anchors are set and that backups are in place in the unlikely event of an anchor failing.

Do not, however, lead participants to believe that they will not fall. Falling is part of learning to climb. The security of a proper belay will protect climbers from falling far. Clear communication with belayers will help ensure that when falls do occur, they will be relatively harmless.

Falling climbers should try to turn toward the wall and use their hands and feet to cushion any impact against the climbing face and to prevent themselves from spinning. They should avoid grabbing the rope; doing so will occupy their hands rather than leaving them free to absorb the force of bumping into the wall.

Once a fall has been arrested, the climber, before finding good holds for the hands and feet and resuming the climb, may want to take a few moments to collect his or her thoughts and reassure those on the ground that everything is all right.

In Case of Injury

Instructors who suspect that a fall may have resulted in injury to a climber must carefully assess the situation before taking action. If the climber can answer questions, instructors should learn what they can about the climber's condition. In most cases, that will provide assurance that it will be safe for the belayer simply to lower the person to the ground for further diagnosis and treatment. However, if the climber is nonresponsive or if instructors suspect that injuries are more than minor, it may be wise for an instructor to rappel to the climber to conduct an up-close evaluation and to be in position to assist in completing a rescue.

CLIMBING CLASSIFICATION SYSTEM

Climbing classification systems rate the difficulty of different climbs. Guidebooks for popular climbing areas use these scales to help people decide which routes match their skills. In the classification system most frequently used in the United States—the Yosemite Decimal System— there are usually five classes.

Class 1—Hiking. The hands are not needed for balance.

Class 2—Simple scrambling. The hands are occasionally used for balance. A rope is not needed.

Class 3—Scrambling. Climbers use their hands and some basic climbing skills. A rope may be used to belay anyone who is uncomfortable with the exposure.

Class 4—Simple climbing, often with exposure. Anchored belays are used, and natural protection can be found easily.

Class 5—Roped climbing with protection. All climbing involves using a rope, belaying, and protecting the leader from a fall. A belay is always required with climbers ascending higher than shoulder height.

Class 5 climbing is further divided into 16 categories of difficulty:

5.0–5.5: Novice and beginning climbers will enjoy these areas. They're a great place to start.

5.6–5.9: The climbs are more difficult. Specific climbing skills such as jamming, liebacks, and mantles are used.

5.10–5.15: These progressively more difficult climbing areas demand physical training and climbing skills, as well as repeated experience climbing that area. These are further divided into a, b, c, and d difficulty.

Aid climbing—roped climbing with artificial assistance—is sometimes considered a sixth class of climbing. Climbers on smooth, steep faces or overhangs place their weight on artificial aids such as climbing stirrups.

BOULDERING

Bouldering is a fine way to learn climbing techniques. While its name comes from the practice of climbers working out moves on actual boulders, it can also be done on any face that presents usable handholds and footholds—the lower reaches of climbing towers, for example, or of stone buildings or artificial climbing walls. (Always obtain permission from owners or facilities managers before bouldering on structures.)

The key to safe bouldering is for climbers to keep their feet fairly close to the ground, never ascending higher than their shoulder height above the ground. The goal is to move gracefully from one hold to the next. Boulderers are more likely to move sideways than they are to go up or down. They often find that bouldering is ideal for practicing the placement of their hands and feet, learning to balance, and increasing the ease with which they can move in a vertical environment.

Anyone engaged in bouldering must be protected by spotters. In addition to spotters, mats or pads should be placed at the base of indoor climbing walls to protect boulderers. Instructors and participants who climb higher than shoulder height above the ground must have a belay to protect them in case they fall. And they will fall. It is part of learning to climb.

SPOTTING

Spotting means providing protection to a boulderer or climber in such a way as to help prevent injury in case the boulderer or climber falls. Assigning spotters is important whenever someone is bouldering. Every boulderer should have at least two spotters positioned to support the head, neck, shoulders, and torso of a falling person. To accomplish this, spotters must:

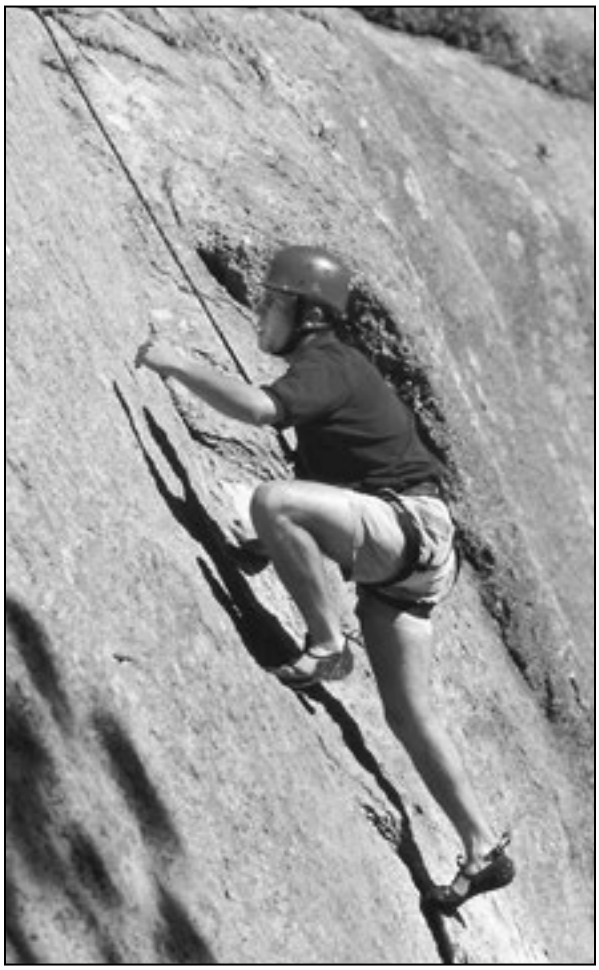
- Assume a stable stance. Their feet should be apart with one foot forward of the other, and their knees and elbows bent to absorb shock.
- Have their hands in the air with fingers together and with the palms turned outward or upward in a supportive position. Another method is to have spotters extend their arms downward with palms facing upward to help lower a falling person.
- Constantly watch the person engaged in bouldering.

Spotters are not expected to catch a falling boulderer in midair—something that is nearly impossible even in a fall of only a few feet, and may result in injury to both parties. Rather, spotters should support the upper body of a falling person, especially the head and neck, and ease that person to a safe position.

Verbal Signals for Boulderers and Spotters

Boulderers and spotters use the following verbal signals to ensure clear understanding of their intentions and actions.

Boulderer	Spotters	Meaning
"Spotters ready?"		"I'm ready to start."
	"Ready."	"I'm ready to protect you."
"Climbing!"		"I'll start up as soon as spotters give a go-ahead."
	"Climb on!"	"Go ahead."
"Falling!"		"I'm about to fall."



Efficient climbing is built on the three-point stance—keeping two hands and one foot on good holds while moving the free foot to a new location, or having both feet and one hand on holds as the free hand moves.

Encourage climbers to lean out a little from a wall so that the weight of their bodies rests on their feet. A climber whose torso is too close to the rock may find it difficult to look down and see where his or her feet are moving. Hands should be used primarily for balance while the stronger muscles of the legs do the work. Whenever possible, climbers should avoid climbing on their knees and elbows, as that can put them in precarious positions and inhibit further movement.

Climbing is both a mental and a physical challenge. Instructors can encourage participants to look ahead and plan several moves as they climb, much as a chess player looks for a larger strategy on the board rather than seeing only the next placement of a piece.

With a route in mind and a sense of the motions required to cover the distance, climbers can link together a series of moves with grace, rhythm, and efficiency. Climbers should strive to be fluid in their movements. Teach them to relax, to concentrate on what they are doing, and to remember to breathe.

Footholds

Various techniques allow climbers to gain purchase with their feet on ledges, nubs, cracks, and other irregularities on a wall or rock face. Regardless of the shoes they are wearing, novice climbers can master footwork needed for large holds. More advanced climbers will find that shoes made specifically for climbing will greatly enhance their ability to move.

The sizes and locations of holds will determine the ways climbers position their feet to take advantage of holds. Encourage participants to place their feet solidly on each hold and keep them still until they are ready to move to the next hold. The foot techniques climbers most often use are *edging, smearing,* and *jamming.*

Edging

A climber can turn a foot sideways and place the edge of the sole on a nub, narrow ledge, or other hold. It may feel most natural to edge with the inside of the shoe, although edging with the outer portion of the sole sometimes makes possible a series of moves.

Smearing

Instruct a participant to place the sole of the shoe toe against the rock. As the foot bends and takes the body's weight, the rock will dig into the sole and hold the climber, especially if the participant's body is vertical and the weight is directly over the feet. The sticky rubber soles of modern climbing shoes are intended to enhance this kind of traction. Both smearing and edging are more difficult to accomplish with hiking boots or regular athletic shoes.

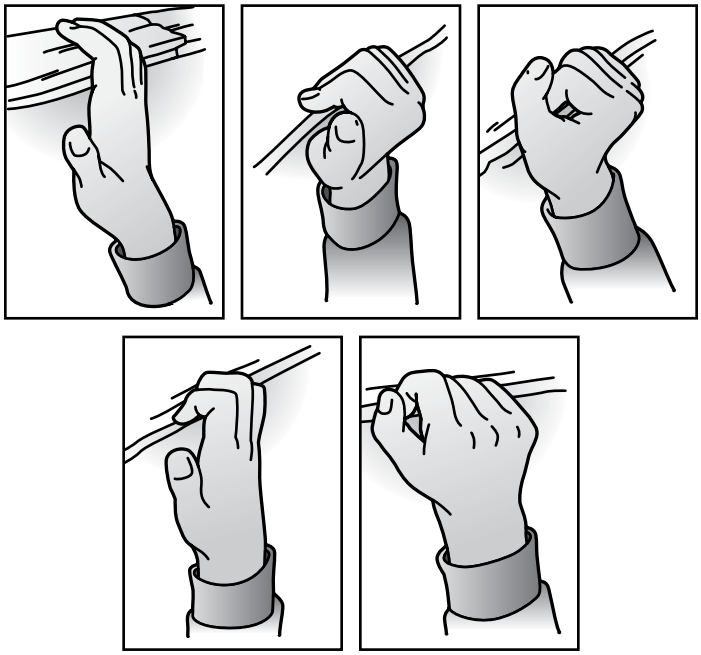
Jamming

Climbers can sometimes fit their feet sideways into cracks in the rock and then twist their ankles to create a more secure stance. A "jammed" foot should wedge tightly enough against the sides of the crack to hold the climber's weight.

Handholds

Holds present themselves in many shapes and sizes, from tiny pockets and small nubs to cracks and ledges. There are a number of ways for climbers to position their hands to take advantage of available holds. However, beginning climbers may not have adequate finger strength to manage some of these holds.

Clings



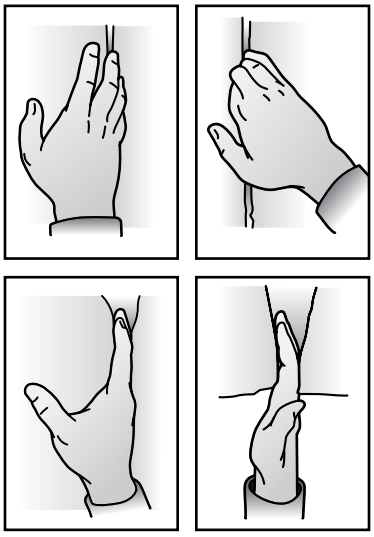
Place your fingertips on the edge of a table, bend your fingers at the second joints, and pull down with your wrist. That's a cling hold, the most common way climbers hang onto edges. If a hold is small, you might cling to it with only a couple of fingers, perhaps with your thumb braced across the top of your fingers. (Climbers sometimes call a big hold—using all four fingers and the thumb—a bucket or a jug because using it is like grabbing the lip of a large container.)

Underclings

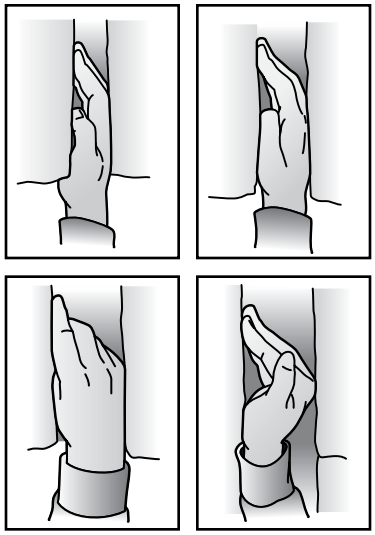
If you are grasping a rock with your palm up rather than down, the hold is an undercling. An undercling works because your hands are pulling one way while your feet are pushing the other. Use the undercling to move sideways along a face or for balance as you search above for your next handhold.

Jams

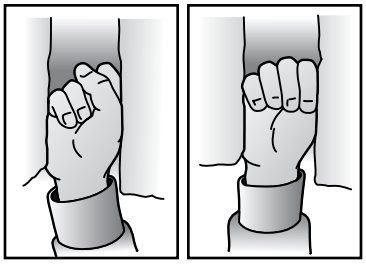
A crack in a wall might be just the right size for you to fit in some or all of your hand. Arch your fingers or clench your fist to tighten your hand in or against the sides of the crack. Knuckles can be taped to avoid injury.



Finger jams are usually done with the thumb pointing down and the fingers twisted to lock them into a solid position. Arch your fingers or clench your fist to tighten your hand in or against the sides of the crack. Try stacking the fingers on top of one another and pressing the fingers and thumb against the sides of a crack.



Hand jams can be used in cracks large enough to accommodate the entire hand. Twist the hand and put the thumb across the palm to create pressure against the sides of a crack. When moving up past a hand jam, be aware that the pressure on the hand will change and the climber may need to change hand and body position to maintain a secure hold. Depending on the size and shape of their hands, different people will approach jamming a crack in different ways.



A *fist jam* makes use of a fist turned or tightened to put pressure against the sides of a crack.

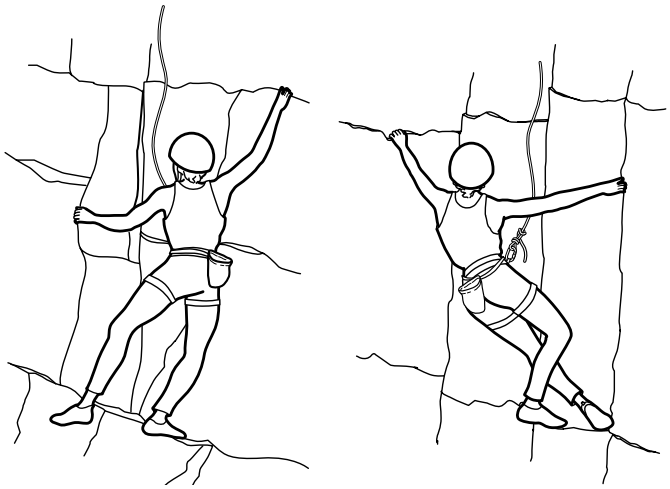
Combination Holds

In certain situations, climbers employ holds that are a combination of handholds and careful foot placement. Combination holds that participants may find useful are *liebacks, counterbalance, chimneying,* and *mantling.*

Liebacks

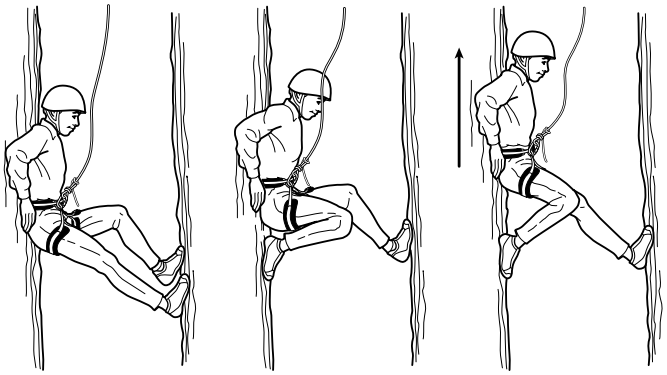
Use a lieback (also called a *layback*) to negotiate where two rock faces meet to form a corner. With your hands, hold the crack where the walls join, then push against either rock face with your feet. Moving one foot or one hand at a time (while maintaining three-point contact at all times), work your way up the route. Constant pressure on your hands and feet will prevent you from falling.

Counterbalance



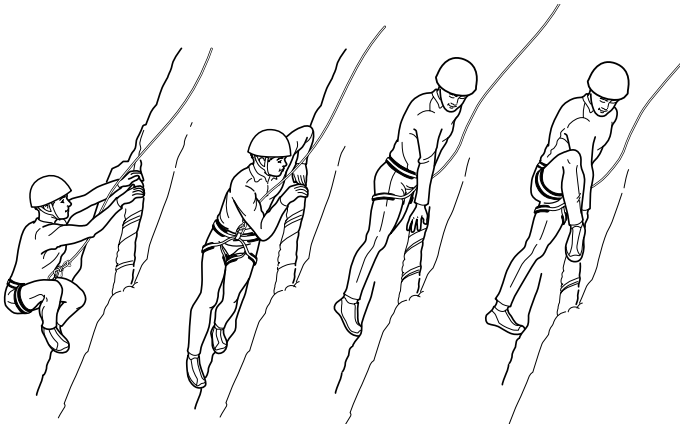
A climber can sometimes extend a leg or an arm to a position that does not offer a solid hold, but rather provides balance during an ascent. Counterbalancing involves the entire body, using position and weight distribution to make the most of minimal holds by applying pressure from the feet or hands in opposite directions to maintain a position. Counterbalancing can take a variety of forms, including crossing one leg in front of the other, a move known as *flagging.*

Chimneying



If a crack in a rock face is wide enough—what climbers call a *chimney*—you can press your back against one side and your feet against the other, keeping your hands low and pressing with the palms. Or you can press one foot and one hand against each side. Move upward by "walking" up with your feet and pushing with your hands against the sides of the chimney. As you straighten your legs and push with your hands, your back slides upward against one side of the chimney. Alternate leg positions with each upward move to help balance the stresses between the legs and avoid cramping.

Mantles

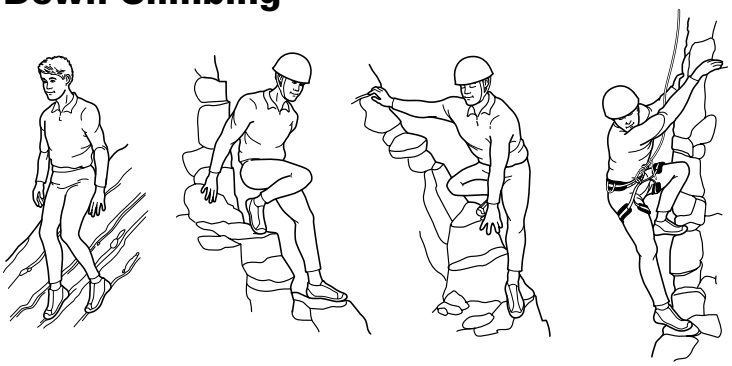


Use a *mantling* move to hoist yourself onto a ledge or over the top of a wall or cliff. First, climb high enough to place a palm on the ledge. Push your body up, then push down as you straighten your arm, using your legs and your other arm as much as possible. Lift a foot to the ledge, then stand upright as if you were getting out of a swimming pool.

Resting While Climbing

Although the top-roped climbs of participants in BSA activities will seldom be of great length, novice climbers may take a while to reach the top. Now and then while making their ascents, it might be helpful for them to rest. Instructors can point out efficient techniques that climbers use to rest—locking the knees or hanging from the arms in ways that use the skeletal system to hold body weight rather than relying on muscles.

Down-Climbing



Because climbers may not be able to see or anticipate the holds as well, climbing down a face can be more difficult than going up. On gentle slopes, climbers should face out and lean forward in a nose-over-toes position that keeps body weight over the feet. Where terrain is steeper, they can move sideways, keeping at least one hand on the rock as they descend. On the steepest walls, it's best to face the rock and use the three-point stance. Leaning out with their weight over their feet will give them the clearest view of the holds below.

CLIMBSMART! PROGRAM

BSA climbing directors and instructors may have occasion to refer to the ClimbSmart! program, a national public awareness campaign designed to promote safe climbing and individual responsibility.

The ClimbSmart! program is based on the four-point universal warning:

- Climbing is inherently dangerous.
- Qualified instruction is required.
- Use equipment according to the manufacturer's instructions.
- Your safety is your responsibility.

Free climbing includes those methods of ascending, descending, or traversing vertical spaces where ropes and other gear are used merely as safety devices. In *aid climbing,* the gear is directly involved in helping the climber move over the rock. Rappelling, for example, is a form of aid climbing where one descends on the rope.

Clean aid climbing is aid climbing done without damaging the rock, i.e., without the use of hammers or bolting. The BSA standards apply just as they do for other types of climbing.

The climber ascends by finding a rock formation that is a match for one of the devices that is attached to the aider or etrier. Once the tool is hooked on the formation, the climber gingerly steps onto the attached aider; if it holds, the climber ascends with due caution.

The climber then either seeks out another formation where another aider can be placed or finds some place where he or she can return to free climbing. In this way, the climber progresses up the rock.

Just as with free climbing, high steps or large lateral steps will often cause the climber to be out of balance or lose the initial hold during weight transfers. These should be avoided if possible.

Clean Aid Gear

Talon Hooks, Grappling Hooks, and Peckers

Talon hook

If these devices do not come with a sewn sling, one will need to be added. One of each should be attached to each aider used. The peckers come in three sizes.

Skyhook

Camming Hooks

Camming hook

Camming hooks are only useful in solid rock with ¼- to 1½-inch cracks. These hooks will generate the torque necessary to remove flakes that can normally be climbed on without an issue.

Aiders (Étriers or Stirrups)

Aiders are the ladders whose use is indicative of aid climbing. Climbers can purchase pairs of commercial aiders or make them out of two 20-foot pieces of flat webbing.

To make an aider:

1. Begin with a frost knot, i.e., fold the webbing in half, but fold about 9 inches of one end of the webbing over the tail end of the other.
2. Take the bight thus formed with the tail inside it and tie an overhand knot. Pull the knot tight.
3. About a foot or so down, tie another overhand knot with both sides of the webbing, but first lengthen one side so it forms a step.
4. Continue forming steps down the webbing.
5. You should get four or five steps from the length of webbing. Adjust them as needed. You might also add a short loop to the frost knot as a loop to hold onto while you are ascending.

Carabiners

One safety carabiner is required per aider. It is suggested that these be steel carabiners as the aluminum varieties do not hold up to the abuse of being scraped and banged against rock.

Safety Glasses

Safety glasses will protect the participant from occasional debris or from equipment that comes popping off its placement. They can be purchased from a local hardware store.

Knee Pads and Fingerless Gloves

Knee pads and fingerless gloves will protect the knees and hands from inevitable scrapes.

CHAPTER 26

Anchoring

A BSA climbing program must have fail-safe anchors securing every participant and the ropes used for climbing and rappelling. Climbing instructors should spare no effort to ensure that all anchor points are reliable and that the anchoring systems attached to them are put together with gear and techniques that meet the highest standards of safety. Lives will depend on it.

An *anchor point* is a boulder, a living tree, an installed bolt, or another fixed point located at the top of a climbing or rappel route or near a belay position. The *anchoring system* consists of the webbing or rope and the hardware secured to the anchor points in such a way that they can be attached to the harnesses and/or ropes protecting belayers, climbers, and rappellers.

At new climbing areas and when establishing new routes, experienced climbing instructors should select the anchor points to be used for each climb, rappel, and belay and oversee the design and use of the anchors attached to them.

Anyone who will be involved in teaching or supervising climbing and rappelling must be versed in the theory, placement, and use of anchors.

Establishing anchors is left to experienced climbing instructors. Instructors will check the security of anchors before anyone uses them and must call a halt to all events if they suspect something has gone awry with any part of an anchoring system. At the end of a day's activities, instructors remove webbing, ropes, and hardware from anchor points and store everything in such a way that those who will next put up the anchors will find the materials in order and ready to go.

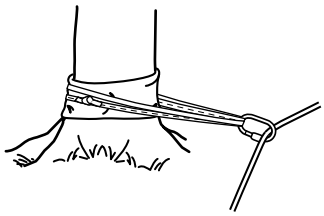
How to set anchors can be learned through BSA courses as well as courses taught by nationally recognized outdoor organizations. Experience is a great teacher, too, but this is one subject that allows no room for error. Seeing to it that anchors are absolutely reliable is the first priority of every instructor.

SAFETY LINES

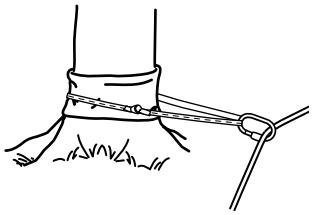
Protect yourself whenever you are working with anchors at the top of a climbing or rappelling route. If working within a body-length of the edge of a cliff (8 feet or less), tie in to an anchor or a safety line before you begin setting anchors. Securing yourself may involve setting an anchor far back from the edge and attaching a safety line to that anchor and to your climbing harness. You can now safely approach the edge while attached to a safety line.

A safety line may be required each day when instructors are setting anchors, and for participants moving from the top of a climb to the top of a rappel. Determine the traffic patterns participants and instructors will follow and protect any exposed sites with safety lines. Consider also how participants will clip into the safety line, release themselves from the climbing belay, and then clip into the rappel system. They must be tied into a belay rope or a safety line that will protect them if they fall.

BSA CLIMBING/RAPPELLING ANCHORS



Basket hitch, looped around the trunk and clipped together with a carabiner.



Retied around the trunk.

The basic principles guiding placement and use are the same for each of the following kinds of anchors common to BSA climbing/rappelling activities:

- Top-roped anchors for belaying climbers
- Rappel anchors
- Anchors for belayers

ANCHOR POINTS

Anchor points may be divided into two categories—natural and artificial.

Natural Anchor Points

Trees, rock outcroppings, and boulders in the right locations at a climbing site are natural anchors that can be used simply by placing around them a sling of webbing or, in some cases, a climbing rope. Natural anchor points have three distinct advantages over other forms of anchors.

- Anchor systems using natural anchor points are often easy to both rig before a climbing session and dismantle when a group is done.
- A natural anchor is often highly reliable regardless of the direction in which it is loaded.
- Natural anchors can be used easily, increasing a group's ability to climb and rappel without leaving a trace.

Trees as Anchor Points

Anchoring to a solid, sizable tree is usually straightforward. The tree must be healthy, securely rooted, and at least 6 inches in diameter at the point of attachment. To set an anchor with webbing, use a commercially

sewn runner or tie a sling, and encircle the tree using a basket hitch. Lay a loop of webbing around the tree and clip to the part of the loop on both sides of the tree. Because the basket hitch is a doubled-up loop, it is twice as strong as the webbing itself.

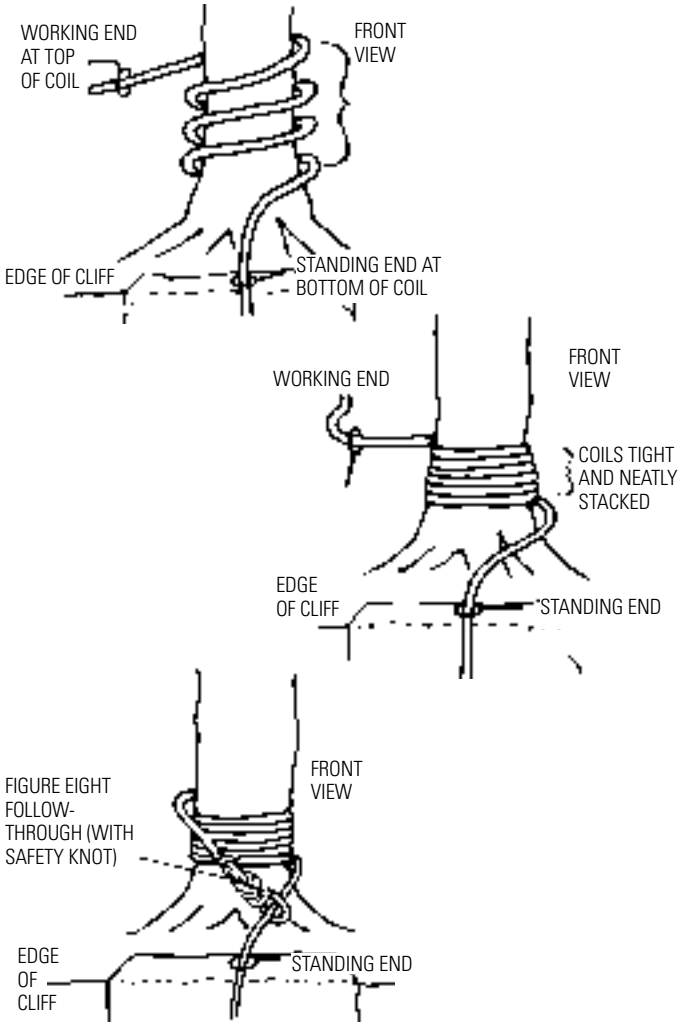
An outdated technique is to girth around the tree. In a girth hitch, one side of the loop is passed through the other side and then the carabiner is clipped into the remaining loop. The girth hitch loses strength where the webbing passes over itself and has only three-quarters of the strength of the webbing.

Another common webbing configuration for tying to a tree is the wrap 3 pull 2. Pass the webbing around the anchor three times and tie a water knot. Pull out the two loops of webbing closest to the water knot to make the attachment point. The wraps of the webbing take up the tension of the participant and the knot doesn't feel any of the load. For this reason, the wrap 3 pull 2 is twice as strong as the original webbing, even though it has a knot tied in it. This makes this anchor stronger than a basket hitch if tied in the same webbing. The wrap 3 pull 2 is a common anchor system used by rescue professionals. A simpler version of it is the wrap 2 pull 1.

When tying any anchor around a tree, keep the webbing close to the ground where the tree is strongest. Placing anchor webbing higher on a tree trunk will increase the forces on the anchor.

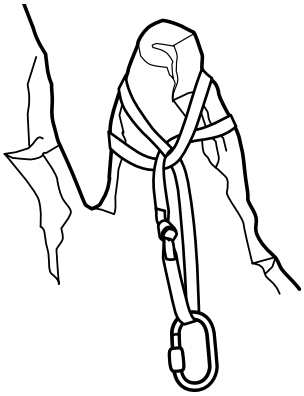
Webbing should not abrade or otherwise harm a tree. If you suspect your anchor might cause damage, shield the bark by placing padding between the bark and the anchoring material. (Canvas, burlap, car mats, carpet scraps, or strips of old fire hose work well.)

To anchor a climbing rope directly to a tree or pole, use a *tensionless* anchor, also known as tensionless rigging. This anchor is tied by wrapping the rope four to six times around the tree and then finishing it off with a loop knot clipped to the standing end. There is so much friction in the wraps of the rope around the anchor that the knot does not feel any tension from the participant, thus the name tensionless anchor. With the tensionless anchor in place, the rope retains 100 percent of its strength. With enough tail at the top, the tensionless anchor can also serve as a releasable rappel anchor. This technique is advantageous in towers that have a center pole extending through the top deck.

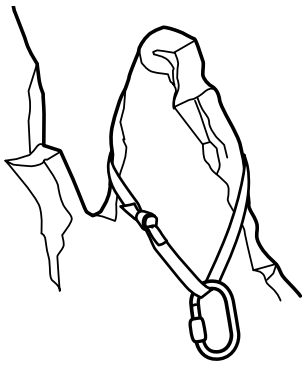


Before anchoring a climbing rope directly to a tree, carefully inspect the tree. Some trees ooze pitch that can be difficult to remove from the sheath of a rope. If you are not convinced that you can attach a rope to a tree without causing harm either to the tree or to the rope, you might be able to design an anchor using a webbing runner instead.

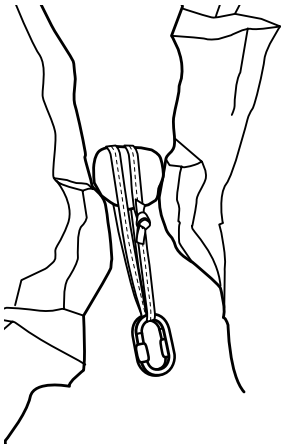
Rocks as Anchor Points



Securing a runner to a rock horn with a clove hitch



Anchoring to a rock outcropping with a webbing runner



Attaching a runner to a chockstone

A boulder can serve as an anchor point if it has sufficient mass and is situated so that no amount of load placed upon it by climbers or rappellers will jar it loose. A rock outcropping has potential, too, if it is a continuous part of a cliff. Another common anchor point is a *chock stone*—a rock jammed into a crack in such a way that it cannot be dislodged. Study any boulder, outcropping, chock stone, or other likely rock formation before relying on it as an anchor point. Is the quality of the rock good? If not, it may crumble or break under the stress of a load.

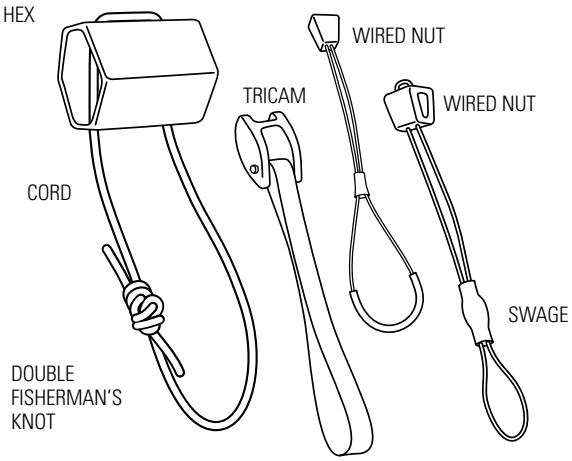
Artificial Anchor Points

Artificial anchor points include bolts installed in solid rock, and passive or active protection.

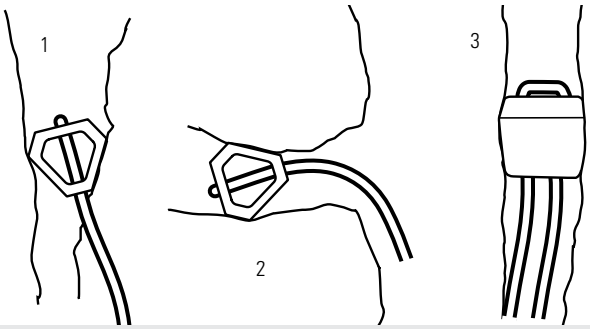
Passive protection consists of commercially made, carefully shaped pieces of metal that can be jammed into cracks in the rock. These pieces of protection work by resting in a constricted area that allows them to function passively.

Active protection incorporates hardware featuring camming devices and other moving parts.

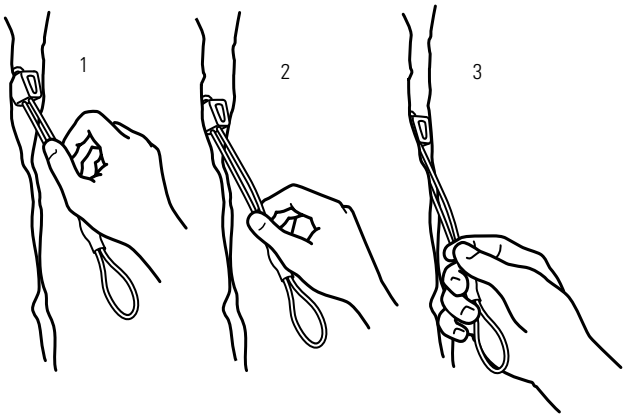
Passive Protection



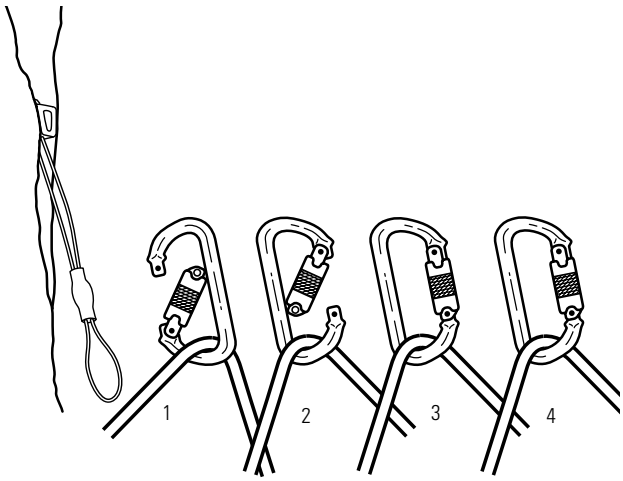
Chocks are available in a wide variety of shapes and sizes.



1) In a vertical crack, as a passive cam—good contact with the rock gives greater holding power. 2) In a horizontal crack, as a passive cam—the sling exits near the roof of the crack for proper camming action. 3) Sideways in a crack, as a passive cam.



1) Placing a wedge into a crack above the constriction. 2) Sliding it into place. 3) Tugging on the chock sling to set it.



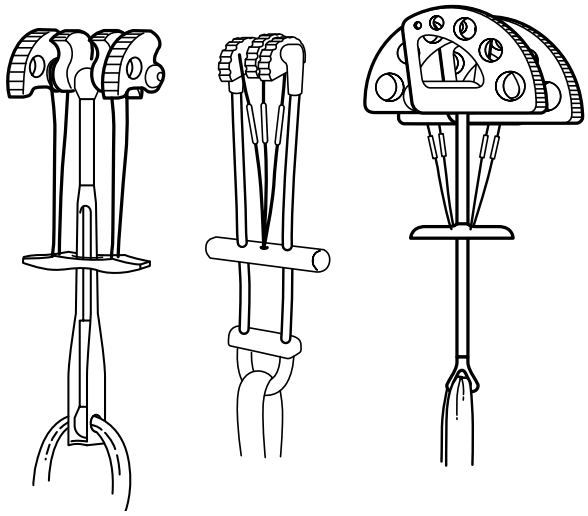
1) Clip a carabiner in a downward direction. Then clip the carabiner to the cordelette or webbing that is being used to construct the anchor system. 2) Rotate the carabiner out and away from the rock. 3) The gate opening is now down and facing out from the rock. 4) Make sure the carabiner orients itself properly when loaded.

In the last quarter century, an assortment of hardware has been developed for the sport of climbing that can be used for setting reliable anchors in cracks. Among these are chocks (nuts). In many cases, all trace of chocks can be removed at the end of a climbing session.

Chocks come in a wide range of sizes, as small as ¼ inch across and as large as several inches. Their shapes vary, too, from tapered rectangles to hexagons of irregular dimensions. Whatever their size and shape, each is outfitted with a loop of wire or drilled holes to accommodate an accessory cord. A chock must be matched in size to the crack in which it will be placed. A carabiner or webbing runner can be secured through the loop attached to a chock, which is, in turn, connected to the rest of the anchoring system.

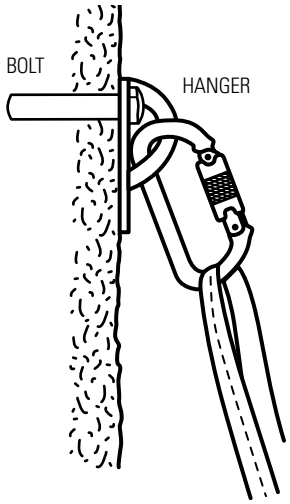
When a load is placed on the chock in the expected direction of pull, it will jam more tightly into the crack. Removing a chock is a matter of pulling it in the opposite direction. A nut tool is handy for popping loose chocks that have become stuck in cracks.

Active Protection



A spring-loaded camming device (SLCD) placed in a crack of a width for which it was designed can provide a very solid anchor point. The cams of the device should not be too open or too closed when they are released inside the crack. Proper placement allows for maximum grip while still being easy to extract. Orient the stem of an SLCD in line with the pull of any potential falls.

Tri-cams are a camming device consisting of a carefully shaped aluminum cam attached to a length of webbing. The webbing is placed over the cam and then the device is inserted into a crack so that pulling on the webbing makes the device cam outward against the sides of the crack, gripping the rock tighter. There is a pointed fulcrum on one side of the cam that can be placed into a small divot in the rock, which can increase the holding power of the tri-cam. Tri-cams can also be used as passive pieces of protection just like chocks.



While chocks and camming devices are removed at the end of a climbing session, bolts are secured in holes drilled into the rock and are permanent. Likewise, the bolt hanger (a bent strip of metal secured by a nut or bolt) also stays in place, providing the means to use a carabiner to connect to the anchoring system.

Bolt Placement

Only qualified experts should place bolts. Bolt placement is beyond the scope of this manual, and should not be attempted by BSA leaders without specialized training and extensive experience. Bolts may be installed at climbing sites on BSA property only with council permission.

Types and Sizes of Bolts

Of the several types of bolts in common use today, only UIAA- or CEN-approved bolts specifically designed for climbing are acceptable.

- Expansion bolt: Expands an attached sleeve as it is driven into the rock or tightened with a wrench.
- Glue-in bolts: The bolt's shaft is glued into a predrilled hole.

Bolts used in climbing areas must be suitable for the rock and of appropriate depth. Hangers attached to the bolts may be colored to match the hues of the rock, thus reducing their visual impact.

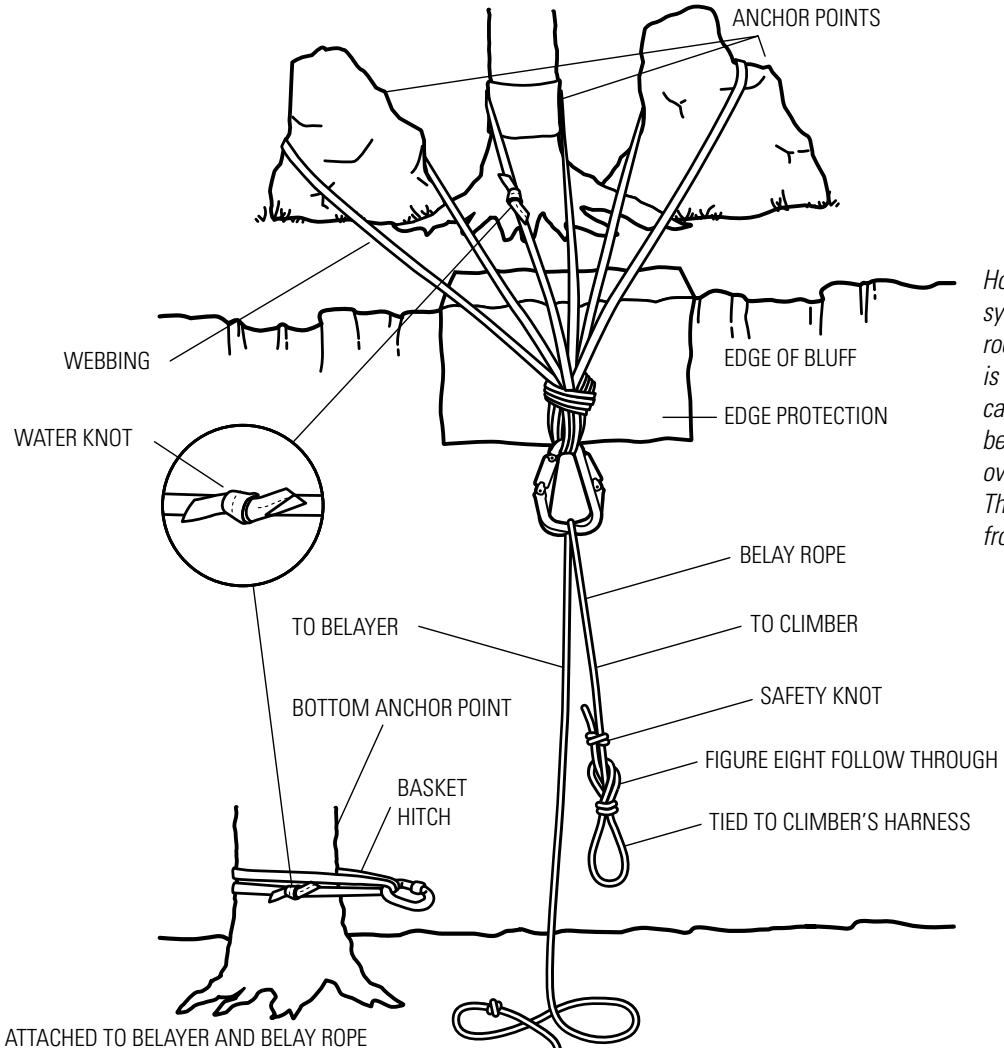
Where bolts and hangers have been placed for use as anchors, instructors must determine the reliability of those bolts before use.

Keep these guidelines in mind:

- The bolt must be fully inserted into the hole and the hanger snug against the rock.
- The bolt and hanger must not be damaged or rusted.
- The rock around the bolt must be solid.
- Never test a bolt by pounding on the bolt or the hanger.
- If a bolt is loose, it must be tightened, removed, or disabled.

Pitons

The Boy Scouts of America does not permit the placement of pitons or the use of previously installed pitons. Pitons you may find in a climbing area cannot be considered reliable. Because they can scar rock and widen cracks, pitons are rarely used today. Instead, climbers use nuts, chocks, camming devices, and other pieces of protection that are easy to remove and will not mar the faces of climbing areas.



How to set up a belay system using a tree and rocks. Note that the system is extended to allow the carabiners securing the belay rope to hang freely over the edge of the cliff. That helps prevent the rope from being abraded.

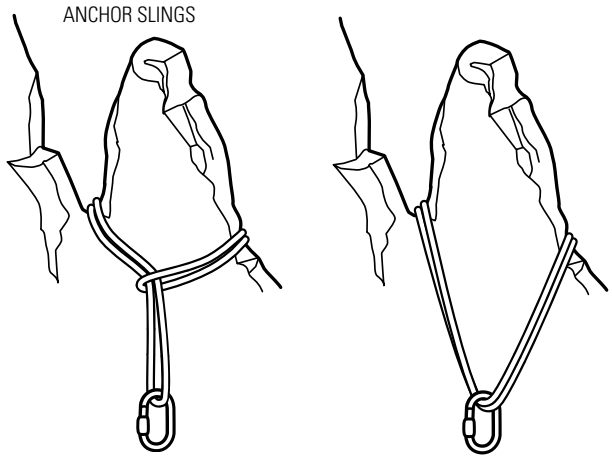
Use multiple anchor points and design each anchor to be failproof so that the entire system has redundancy built into it. Different types of anchors should be used for each anchoring system, such as a large tree or boulder, a climbing nut or chock, a bolt, or a spring-loaded camming device.

Redundancy is a key concept in anchoring. Securing belayers, climbers, and rappellers to systems attached to several anchor points provides a backup in the anchor system. However, many towers have a single anchor point, and a healthy, well-rooted, large-diameter oak tree might be used by itself.

For practicality in running a BSA climbing/rappelling program, keep anchoring systems as simple as possible. Instructors must be able, without difficulty, to set up the systems before a session begins and to remove the equipment at the conclusion of the day's activities. The layout of each system must be clear so that, while the system is in use, instructors can be certain of its security. Of course, an anchoring system is adequate only if it is fail-safe. Each anchor should be placed so that it provides the most effective protection. An anchor system must not be loaded in any direction other than the intended direction of pull.

Equalized, Angle, Redundant, No Extension, Solid, Timely

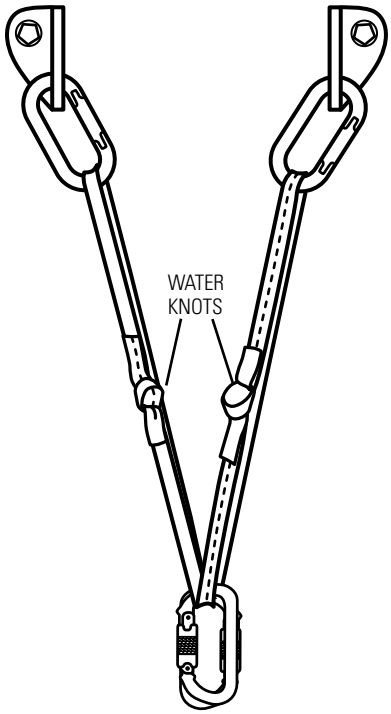
ANCHOR SLINGS



This situation applies to other situations that bend and pull the rope at angles greater than 120 degrees.

This is the preferred way of using an anchor sling.

SIMPLE STATIC EQUALIZATION

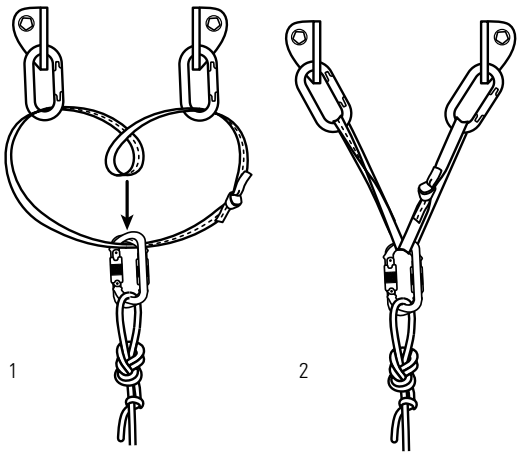


Every anchoring system must exhibit the essential qualities that spell EARNEST: **E**qualized, **A**ngle, **R**edundant, **N**o **E**xtension, **S**olid, and **T**imely.

- **Equalized.** Develop each anchoring system so the load is distributed as equally as possible among all the anchor points. That will reduce the strain on a given point and reduce the chances of any of the points failing.
- **Angle.** Keep the angle less than 90 degrees between the outside legs of the anchor system, unless the anchoring system is designed for larger angles. Belay cable systems with 10 percent drape form much larger angles but are designed to withstand much higher forces.
- **Redundant.** All anchors must be fail-safe or backed up. If you have even the slightest suspicion that an anchor is anything but completely reliable, build enough redundancy into the system so that the failure of an anchor will not imperil a climber, rappeller, or belayer.
- **No extension.** If an anchor point fails, the anchor system will not extend and be shock loaded.
- **Solid.** Anchors must be reliable. There is no room for compromise. Take all the time you need to do the job right. If you are unsure of your expertise, find someone who is qualified to provide guidance.
- **Timely.** Use your time wisely and efficiently. Send staff ahead to set up so that the program is ready to go when the participants arrive.

Equalization in Anchor Systems

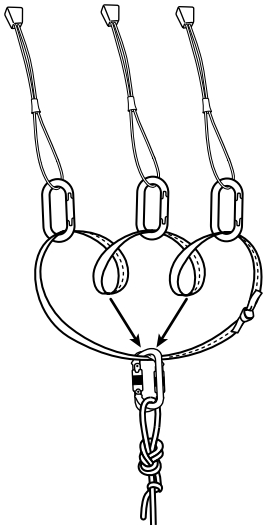
TWO-POINT SELF-EQUALIZATION



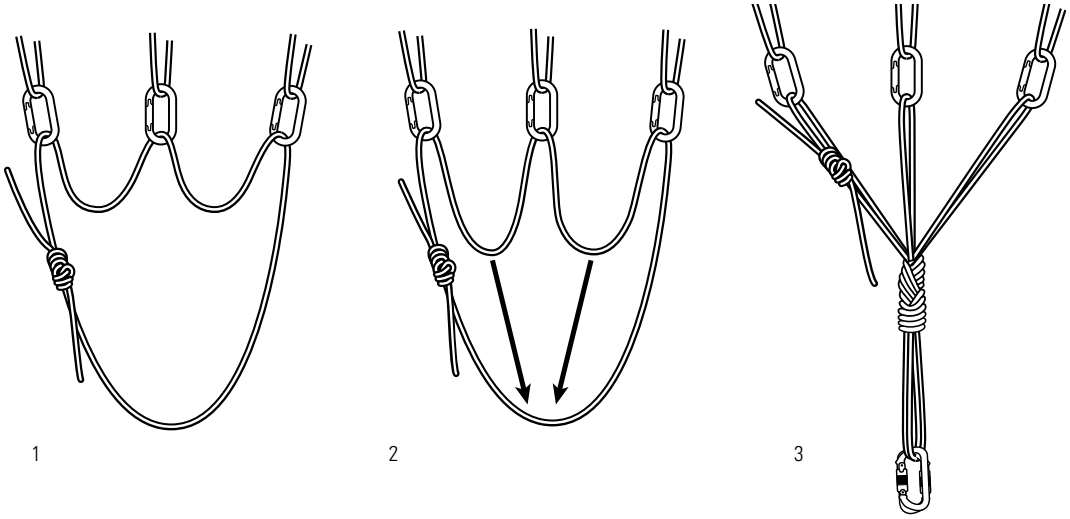
1) *Clip a single runner to the anchor carabiners and form a loop at the top.*

2) *Clip into the loop and the bottom part of the runner.*

THREE-POINT SELF-EQUALIZATION



PRE-EQUALIZATION WITH CORDELETTE

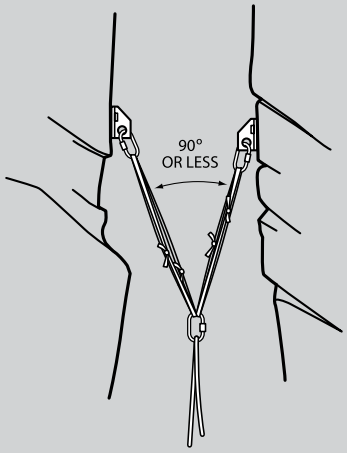


1) *Clip the cordelette into three anchors.*
2) *Pull the segments between the anchors down.*
3) *Clip a locking carabiner into the loops, grasp all three loops together, and tie an overhand or figure-eight knot.*

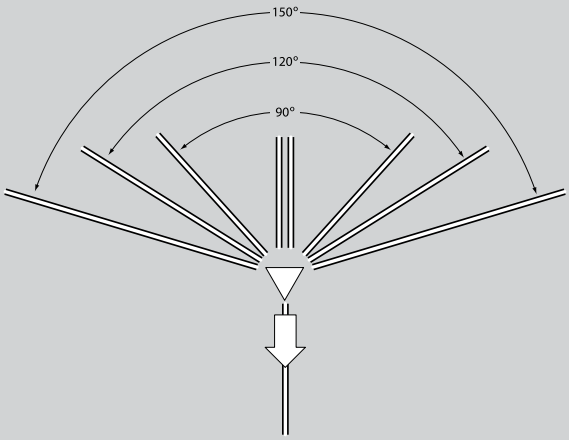
A properly equalized anchor distributes forces to all points of the anchor system. The points may be a combination of bolts, trees, rocks, cables, or pieces of artificial protection. There are two types of equalized systems: self-equalized and pre-equalized.

- A self-equalized anchor may also be called self-adjusting. A loop of webbing or cordelette is attached with carabiners to several anchor points. The webbing from each leg of the anchor system is brought together as shown in the top three illustrations. This will allow the anchor system to adjust itself if a climber were to traverse sideways. Because a self-equalized system would always have some extension if one point of the system were to fail, the half twists in the upper portions of the webbing or cordelette are used to limit the extension. This anchor is commonly called a magic X or sliding X.
- A pre-equalized anchor is designed to work in only one direction of pull. A loop of webbing or cordelette is attached with carabiners to several anchor points. The webbing from each leg of the anchor system is brought together as shown in the bottom three illustrations. Clip a carabiner into all of the loops. Pull the carabiner in the direction of pull. Tie an overhand knot or figure eight knot with all of the loops.

Be sure to keep the overall angle between the outside legs less than 90 degrees.



The forces on the individual points of the anchor system increase as the angle between the anchor points increases.



Angle between anchors	Resulting tension on each side relative to load
150 degrees	200 percent
120 degrees	100 percent
90 degrees	70 percent
0 degrees	50 percent

The angle the rope makes between the two anchors can place stresses upon the rope that far exceed its working load. Situations might arise that cause each anchor to sustain more than the actual weight of the load. When the two ropes form a 120-degree angle, each leg of the anchor is supporting 100 percent of the load. Angles greater than 120 degrees cause the tension to increase dramatically. At 150 degrees, the load is 200 percent of the original load on each leg.

A line in *The Shawshank Redemption* gives us a hint: "Don't be obtuse." Keeping the legs of the anchor system within 90 degrees is a safe relationship.

Cordelette

With a minimum of equipment, a *cordelette* can divide the force of a load among several anchor points. Begin the cordelette by forming a loop with a double fisherman's knot in about 20 to 24 feet of accessory cord with the appropriate breaking strength. Connect the loop to each anchor point using a carabiner. Draw the slack from the cord to form a separate bend between each anchor, then gather the bends together and secure them with an overhand knot or figure eight knot. Clip a carabiner into the loop of the knot and use it to secure a belayer, a climbing rope, or a rappel rope.

Equalette (Two-point)

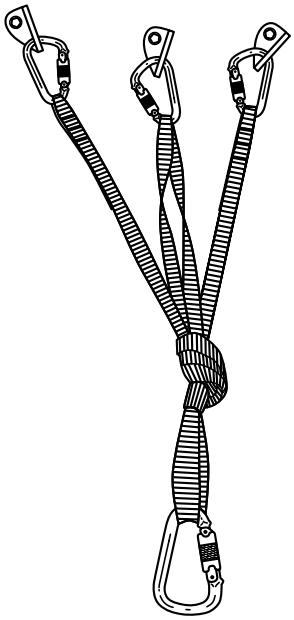
Begin the equalette by forming a loop with a double fisherman's knot in about 20 to 24 feet of accessory cord. Tie two overhand (limiting) knots in the sling to create the attachment point that will be at the bottom of the sling. Connect the loop to the two anchors using carabiners. Attach one carabiner to each strand between the limiting knots to create the master point. The climbing rope will run through both carabiners.

The equalette is a self-equalizing anchor. It equalizes easier than a sliding X or magic X as it does not have the friction of the cordage wrapping around the carabiner. An equalette may be made with three or four anchor points instead of just two. The climber just needs to split the sling going to the anchor between two different anchors. Connect to the carabiners on those two points with clove hitches to spread the load evenly.

If the cordage is long enough, the equalette may be doubled for additional redundancy.

Web-o-lette

The Web-o-lette® is an anchor sling designed for use in recreational rock, snow, and ice climbing. It is basically a webbing cordelette with commercially sewn eyes in the ends.



Limiting Knots

In self-equalized systems, a climber may tie a knot in the sling of an anchor system between the anchor and the master point. This knot will limit the amount of extension in the event that a piece of protection comes loose. Limiting knots also provide redundancy by creating separate loops in the sling. The placement of limiting knots along the sling will control how far the carabiner can slide across the sling. Limiting knots may be tied in the individual legs of the anchor, such as an equalette. Typically, overhand knots are used for limiting knots.

REMINDERS FOR SAFE ANCHORING SYSTEMS

- Each anchor must be failproof or backed up and the load equalized.
- Examine every anchor before using it, even if at first glance everything appears to be in order. Before trusting it, understand an anchor's strengths and weaknesses.
- Do not allow a rope to run over nylon webbing. Friction created by the motion of the rope may melt the webbing and lead to system failure.
- Set and rig anchors in such a way that the system is set up with the direction of pull.
- Keep the system simple so that it is convenient to set up and easy to monitor.
- During periods of use, anchoring systems should be periodically checked to make sure they are secure.
- Use the minimum amount of hardware to do the job safely and efficiently. Each component introduced into an anchoring system is one more piece that could fail.

CHAPTER 27

Teaching the Climbing Merit Badge

When the Climbing merit badge is taught in a summer camp setting, there are usually five sessions of 1½ hours each. The merit badge can be taught at a climbing tower or other suitable artificial structure and/or a natural rock site either on BSA property or off-site, provided that suitable permission is obtained.

Trained and approved instructors and counselors must be utilized.

Even though there is no age requirement, many camps and councils have an age limitation for earning the Climbing merit badge for two reasons:

- To keep the number of participants to a manageable level.
- Because climbing is a challenging activity and might not be very appropriate for 11- and 12-year-old Scouts.

Make sure that you have adequate equipment for all participants and staff.

Design your instruction schedule with these points in mind:

- The Scouts want to climb.
- Sitting and doing bookwork for long periods of time will get boring for participants.
- Instruct the proper use of knots, carabiners, helmets, harnesses, signals, and belaying.
- Have belay training and teach some knots on the first day.
- Add specific information about requirements as they become apparent during your instruction.
- Utilize a group, individual, or buddy rotation for some requirements: Do a climb. Do a rappel. Then belay a climber and a rappeller.
- Provide open climb time for practice and improvement of skills.
- Add more knots and rappelling on the second day.
- Start with a ground rappel school before rappelling from higher levels.

To meet the three different route requirements on a rock face or climbing wall, it is acceptable to rappel down a single face or wall three times. Move slightly to the right or left to give a variety of holds, ledges, or features.