6

	BELAYING
INTRODUCTION	1
CAUTIONS ABOUT BELAYING	1
PREPARING TO SET UP A BELAY	2
Tying In To The Anchor	2
Picking A Safe, Comfortable Belay stance	2
Taking Slack Out of the System	
SETTING UP THE BELAY DEVICE	
Slot-Type Device (e.g., Sticht Plate, ATC, Sheriff, Jaws)	4
Muenter Hitch	4
Figure-8 Descending Ring	6
Body Belay	6
PREPARING TO BELAY	7
BELAY TECHNIQUE	
Lowering A Climber	10
Finishing The Belay	10

INTRODUCTION

The belay is the basic safety technique used to protect the climber from injury in the event of a fall. This is the most important subject in the AMC Basic Climbing School, because it directly affects **other people**. When you belay, the climber's life and safety is in your hands.

The parts of the basic belay system are best described as links of the "belay chain." The **belayer anchor**, the **belayer**, the **belayer harness**, the **friction belay device**, the **rope**, the **toprope anchor** (in a redirected slingshot belay), the **climber's tie-in knot** and the **climber's harness** are the links in the chain. **Belay friction** allows the belayer to control and limit the fall of the climber. The rope attaches to the climber and is designed to absorb the energy of a fall and minimize the impact on all components of the belay chain. The belayer acts as a "safety ratchet" to control the length of rope extending to the climber, pulling in extra (slack) rope through the belay device as the climber ascends and using friction to prevent the rope from moving back through the device during a fall.

CAUTIONS ABOUT BELAYING

• Always check four things before you belay:

- Your harness is doubled back
- The belay biner holding your belay device is locked and correctly oriented
- Your belay device setup is correct
- The belay anchor is good (in the case of a slingshot belay, there may not be an anchor)
- Always check three things before you climb:
- Your harness is doubled back
- The rope has been threaded through both the waist loop and the leg loop connector
- The tie-in knot is correct
- The belayer should double-check the climber's tie-in.
- The climber should double-check the belayer's setup.
- Always set an anchor for a top-rope belay.
- Almost always set an anchor for a leader belay (take the lead school to understand the possible exceptions).
- Set an anchor for a slingshot belay if:
- The climber outweighs the belayer
- The belayer's stance is precarious

PREPARING TO SET UP A BELAY

Get ready by clipping in to the belayer anchor and finding a safe, comfortable belay stance. The following discussion assumes that the anchor is already set up (anchor setting is beyond the scope of the Basic School).

Clip a locking biner into the belay loop; this is the belay biner. For a right-handed belay, orient the spine to the right; for left-handed, orient the spine to the left. You may want to use gloves to protect your hands from rope burn.

Tying In To The Anchor

There are two main types of anchor tie-ins: a **top-rope anchor** and a **redirected** or **slingshot anchor** (fig 6-01). In the top-rope anchor, the belayer is above the climber at the top of the climb and the rope goes from the belayer directly to the climber below. (The term "top-rope" anchor also refers to any anchor set above the climber, but for purposes of this discussion, it will refer to an anchor in which the belayer sits above the climber.) In the redirected anchor, the belayer is at the same level as the climber, and the rope goes from the belayer to the anchor above and then back down to the climber. The anchor placement will have an impact on where you set your belay stance, but should be set to allow you to use the best stance.

In a top-rope anchor, the anchor can be a large boulder or tree (fig 6-01, left), a projection on the rock or any one of various pieces of artificial protection (called "pro"). A combination of slings, rope, and hardware are used to construct an anchor system. Clip in to this anchor system. If you are near the edge on a top-rope belay, set a personal anchor for yourself before you move close to the edge. Leave this attached until after the belay is complete and you have moved back away from the edge.

Clip into the anchor using a separate biner from the belay biner. This clip-in must prevent you from being pulled off the ledge; in a fall you will be holding the climber's weight, including any extra weight generated by the fall. Anchor the rope by tying a figure-8 knot in the end of the rope and clipping it into one of the anchor pieces; this prevents you from throwing the whole rope overboard. Flake the rope and prepare it for throwing (see Ropes). Yell "ROPE!" and wait for people below to take cover. Yell "ROPE!" again, toss the rope, then check that the climber can reach it.

Do NOT knock rocks down on your friends below. Remove any rocks poised at the edge waiting to be launched. Move them gently back from the edge so that you don't knock any off. Put packs and other gear out of the way and clip them to the anchor also, unless they can be placed far enough away from the edge.

To tie in to a redirected belay anchor (fig 6-01, right), attach a sling

> Fig 6-01—(left) a typical top-rope belay; (right) a typical redirected or slingshot belay, each showing the components of the belay chain



AMC Basic Climbing Manual, Rev. 03/01/03

or prusik to a harness locker and lock it. Attach the other end to the anchor using another locker and lock it, also. The forces on the belayer in a redirected belay are not as strong as those in a top-rope anchor, but they can jerk you around if the climber significantly outweighs the belayer.

Picking A Safe, Comfortable Belay stance

Your stability (and therefore your ability to belay) is radically affected by your position with respect to the anchor. Visualize where the load (the climber) will end up should a fall occur. The load will seek a straight line from the load to the anchor. That line is the **line of action**. Also, ensure that the stance is free of rockfall and other danger, and is comfortable enough that you can stay in it for the duration of the climb. There are three main stances: the sitting belay, the standing belay and the hanging belay.

The **sitting belay** is usually more stable and more comfortable in a top-rope belay. Sit with your legs over the edge, with feet braced on ridges, projections or other boulders. Minimize the action of the climber's rope rubbing against the rock. In a slingshot anchor, sit facing the climb with your feet braced. Leaning back can relieve "belayer's neck," a result of looking up for too long.

The **standing belay** is less stable in a top-rope belay, but if the ledge is too small or uneven, set the anchor above your hips and stay in the line of action. If the climber falls, you will have to hold his/her weight with your legs, so set it so that the anchor will help support you. In a slingshot belay, the standing belay is quick and convenient; set the anchor below your hips, aimed to catch an upward pull. Brace your foot against boulders, trees, or the rock face in front of you.

The **hanging belay** is used on a multi-pitch climb when there is no ledge available. You will hang in your harness, with your feet on the wall to steady your weight, and the belay will be done directly from the anchor. This can be very uncomfortable.

Sit or stand such that the anchor tie-in is pulled snug. Your body should absorb some of the impact of the fall. If you make the anchor tie-in too snug, you may be belaying directly off of the anchor. If you leave too much slack in the anchor tie-in, you will be jerked around unexpectedly and can shock-load the anchor. However, if your climber significantly outweighs you, you should belay directly off of the anchor to prevent injury to yourself. In both cases, make sure that a fall cannot pull you off your stance.

In deciding which stance to use, take into account the line of action. In a top-rope anchor, the line of action goes from the climber to the anchor. In a slingshot anchor, there are two lines of action. The first line of action extends from the climber to the anchor above. The second line of action extends from the anchor down to your anchor. (Technically, the line of action in a slingshot anchor extends from climber to belayer, but it is divided into two lines for purposes of this discussion. The line of action is discussed in more detail in the Anchors Class.) You need to sit or stand so that you are within the line of action. If not, a sudden, strong sideways (or upward) force can knock you over in a fall, possibly causing you to release the brake hand.

Belayer safety is critical: stay out of the way of rockfall, and wear a helmet if there is any possibility of such. Make sure you will not be pulled into cactus, or off of a boulder. If you are injured, your climber is in extreme danger. If you feel your belay position is dangerous, move. (This may require the help of someone experienced at setting anchors.)

Belayer comfort is less important, but get into the habit of finding a stance that is comfortable. Annoying positions may cause you to try adjusting something while the climber is climbing, which can lead to a mishap. A typical belay can last 30 minutes so you must be prepared to sit or stand in one place for at least that long. Belay stances get very windy and cold or hot and exposed. When sitting as a captive audience, these conditions often amplify themselves, so dress accordingly.

Taking Slack Out of the System

Decide which hand you want to use as your brake hand, then set up the belay and settle into the belay stance. You should know how to belay with either hand, as there are situations in which you are forced to belay with your opposite hand.

Go through the safety checks: the climber checks the harness, knot and tie-in, and the belayer checks the harness, belay biner and the rope. Wait for the climber to say "READY," then pull all the extra rope (hand over hand) toward you, until you feel the climber's weight on the other end and the climber says "THAT'S ME." Stack the extra rope on your brake side if there is room. It is okay to stack the rope on the other side, but this is usually more awkward.

SETTING UP THE BELAY DEVICE

Thread the rope through a belay device. The device works by allowing friction to be applied to the rope by the brake hand to prevent a climber from falling too far. There are a number of belay devices on the market, and each has its pros and cons. Modern devices can apply several hundred pounds of stopping power to the rope.

Most harnesses have a belay loop specifically designed for belaying, rappelling and personal anchoring (some, such as the Black Diamond Bod Harness, do not have a belay loop). The belay biner can be clipped to the belay loop or through the rope tie-in (through the waist loop and leg loop connector of the harness in the exact same place as the rope is tied). Some people will prefer to use a belay biner through the rope tie-in area due to having shorter arms; it can

get tiring reaching farther away from the body and taking shorter belay strokes. This is quite safe, and the decision by the student should be a matter of his or her preference after trying both. The belay loop is the preferred technique for the following reasons:

- The belay biner is easier to see and check
- The belay biner is less likely to cross-load
- You can add a safety prusik or autoblock backup while rappelling if necessary

If the belay biner is installed on the waist loop, the gate will face either up or down. If the belay biner is installed on the belay loop, the gate will face either right or left; in this case, the spine of the biner should always face the brake side to avoid any chance of the rope opening the gate of the biner.

Slot-Type Device (e.g., Sticht Plate, ATC, Sheriff, Jaws)

Slot-type devices include the Black Diamond ATC, Trango Pyramid or Jaws, HB Sheriff, Blue Water Air Brake, Salewa Fangs and Sticht plate. There are two slots, allowing for a double rope rappel or double rope belay (beyond the scope of this class), or in some cases, a different size rope. Most have a keeper made of cord, wire cable or alloy. They work by inserting a bight of rope and clipping the bight and keeper into a locking biner (fig 6-02a). When you apply force to the brake hand, the device locks down on the rope, preventing it from moving.

- 1. Form a bight in the rope that leads to the climber and poke it through one of the slots on your device. Note: for a right-hand belay, if you use the right-hand slot of the device, it will provide a smoother belay; when the left-hand slot is used, it tends to torque the device to the side and cause a jerky belay.
- 2. Clip that newly formed bight and the keeper cable into a belay biner and lock it. The slack rope should exit from the friction device assembly to the brake side. This slack rope will be your "brake rope."
- 3. If you want to reverse the side with the brake hand, simply unclip the assembly from the belay biner and rotate it 180 degrees and re-clip it.
- 4. To set up a double rope rappel, make a bight in both ropes and insert each one into a slot on the device. Clip both bights and the keeper cable into the belay biner. Note: clipping only one bight of rope into the device will cause the entire belay or rappel to fail (fig 6-02b)

Muenter Hitch

The Muenter hitch belay is an emergency alternative to a friction device. It uses the same setup, the only difference being that the friction device is replaced with the Muenter hitch. The disadvantage of it is that it tends to introduce kinks in your rope (fig 6-03).

The Muenter hitch works most smoothly if done on a **parabiner** (also spelled pearabiner), a locking biner that is extra large at one end. These are also referred to in stores and catalogs as **HMS** (from the German word *Halbmastwurfsicherung*—half-clove-hitch) biners. We teach it in this class as an emergency backup to the friction device.



AMC Basic Climbing Manual, Rev. 03/01/03



Rev. 03/01/03, AMC Basic Climbing Manual

- 1. Form a loop in the rope.
- 2. Fold the loop toward the rope. This results in a loop in which one part has two strands and the other has one strand.
- 3. Clip your belay biner over the two strands.
- 4. Lock the belay biner. Rotate the biner so the gate faces down and the Muenter hitch is at the wide end of the biner.
- 5. The rope can be pulled in either direction. When the rope direction is reversed, the hitch will pass through the biner. The belaying and braking motions are the same as with a friction device; however, the position of the brake hand varies the friction that is applied to the braking action. By applying the brake hand in a direction identical to that used with slot-type devices (toward the rear of the body), the least amount of braking power is applied, but it is still quite sufficient to catch a fall. By applying the brake hand parallel to the belay rope (directly away from the body), the greatest amount of braking power is applied. Various angles in between apply varying amounts of braking power, with the lesser amounts being applied as the brake hand approaches the body. We recommend that you use the standard braking motion (to the rear), as this motion will become automatic for you during the class.

Figure-8 Descending Ring

The figure-8 was designed primarily for rappelling, but can be used quite safely for belaying (fig. 6-04). It should never be used in any other configuration than the one described below. There is a "sport mode" (fig. 6-02b) which can be very dangerous because it applies very little friction to the rope. It is constantly warned about in climbing literature, but some people still use it.

- 1. Form a bight in the rope leading to the climber and poke it down through the small hole of the figure-8.
- 2. Clip the bight into a belay biner and lock it. The slack rope should exit from the friction device assembly to the brake side. This slack rope will be your "brake rope."
- 3. If you want to reverse the side with the brake hand, simply unclip the assembly from the belay biner and rotate it 180 degrees and re-clip it.



AMC Basic Climbing Manual, Rev. 03/01/03

Body Belay

The body belay is a last-resort alternative to a friction device. If necessary, it can be done with only a rope. The differences between the friction device belay and the body belay are that the friction is generated by wrapping the rope around the body instead of around a carabiner/friction device and that the braking motion is accomplished by crossing the brake hand across the body toward the climber's rope instead of pulling back on the brake hand. This method can result in bruised body parts and rope burns, especially if the climber outweighs the belayer. It may come in handy in canyoneering or fourth-class terrain with low-angle faces and inexperienced climbers. Again, it should be used only as a last resort to actually belay someone (fig. 6-05).

- 1. Pass the climber's rope around your left side, behind you and to the right.
- 2. Grab the climber's rope with your left hand extended.
- 3. Grab the brake rope with your right hand, close to your hip.
- 4. Belay as with a friction device, except brake by pulling the rope across your body.
- 5. Reverse for a left-handed belay.

PREPARING TO BELAY

This discussion assumes a right-handed belay (fig 6-06). Pay special attention to the double-checking of the anchor system and the double-checking of the climber and belayer by each other. This is not a measure of your knowledge or competence. It is simply a recognition that no one performs a given technique perfectly every time. Experienced climbers have bad days; experienced climbers have other issues in life that they think about while getting ready; and experienced climbers make mistakes, just like the rest of us. This double-checking is a safeguard against that day when you space something out. It takes only seconds to do—always double-check.

Double-check your anchor system. Sit in the belay stance, sliding forward to take almost all of the slack out of the anchor system. Put some body weight on it by leaning away from the anchor toward the line of action. (Remember on a top-rope belay to keep your personal anchor on until the belay is complete and you have moved back away from the edge.) This will allow you to catch and correct problems such as twists, side-loaded biners, slings passing over sharp edges or not being in the line of action. Do not rush or skip this step, and do not fully trust the anchor until you have test-loaded it.

2. Double-check the climber's tie-in. Make sure:

- a. The climber's harness is doubled back.
- b. The climber's tie-in knot has been threaded through both the waist loop and the leg loop connector.
- c. The climber's tie-in knot is correct.
- 3. Have the climber double-check your belay setup. Have the climber make sure:
 - a. Your harness is doubled back.
 - b. The belay biner holding your belay device is locked.
 - c. Your belay device setup is correct.
 - d. Your belay anchor is good. (In the case of a slingshot belay, there may not be an anchor.)
- 4. Put on your gloves if you choose.
- 5. Grasp the brake rope from underneath, palm up, with your right hand (the "brake hand") a few inches from the friction device.
- 6. Extend your left hand (the "haul hand") straight out in front of you and grasp the climber's rope.
- 7. Yell or say "ON BELAY!" depending on whether it is a top-rope or not. The climber now trusts you to keep him on belay until told otherwise.
- 8. From this point until the climb is finished:
 - a. Never remove the brake hand from the rope, even for a microsecond; a fall can happen at any time.
 - b. To move the brake hand, slide it along the rope without opening your fingers and without grabbing the other rope.

c. Your brake hand should always hold the brake rope and only the brake rope.

- 9. Wait for the climber to say "CLIMBING."
- 10. Respond "CLIMB" and begin belaying.

Braking or Stopping a Fall

In order to stop a fall, you must generate enough friction to "lock off" the rope, or stop it from moving through the belay setup. This simple lock-off action must become automatic. If the climber is stopped for awhile (e.g., to re-tie shoes, pull a piece of protection), it is a good idea to keep him locked off until he is ready to climb again

1. REMEMBER, YOUR BRAKE HAND MUST NEVER LEAVE THE ROPE.

- 2. When you sense a fall (either because the climber tells you he is falling or because of sudden weight and tension on the rope), immediately pull your brake hand back to your side. The resulting tension on both ropes (climbing rope and brake rope) pulls the belay device firmly against the carabiner. The sharp bend in the rope causes massive friction, which stops the fall. As long as the brake rope is held back, the load rope will not move.
- 3. When no weight is on the rope and you wish to resume belaying, move the brake hand forward.

BELAY TECHNIQUE

Learn and practice belaying as a four-step motion. Start with the haul hand extended and the brake hand to the right of your right hip (fig 6-07a). The pcitures shown are for a right-hand belay. The following page shows a left-hand belay (fig 6-07b).

- **1. Step 1.** Pull the "haul hand" toward you and extend the "brake hand" away from you without quite straightening it all the way; note that you just hauled up about 1.5 feet of rope.
- **2.** Step 2. Keeping the brake hand almost extended and gripping only the belay rope with that brake hand, extend your haul hand beyond the brake hand. Grasp both ropes with your haul hand.
- 3. Step 3. Slide the brake hand back along the brake rope to your right hip, gripping only the brake rope.
- 4. Step 4. Release the brake rope with your haul hand and re-grip just the load rope.

Remember, never remove the brake hand from the rope.

- 5. Repeat steps 1-4 as needed, keeping the rope just tight enough to feel the climber, not support him.
- 6. On a top-rope belay, if the climber stops moving and you cannot see him, you must test the haul side rope every few seconds to determine whether or not he has moved up. Do this by keeping your grip on the haul rope with your left hand and slowly twist your wrist toward you. It is rather like sitting on a riverbank waiting for a fish to nibble on your line. When the climber moves, you'll feel the rope go slack, and you can repeat steps 1-4 again.
- 7. When the climber is resting, keep your hand in a locked-off position beside your hip to minimize the possibility of being surprised when the climber moves again.
- 8. Do not rest your brake hand near the belay device. Your hand could get pinched by the system if your climber falls.
- 9. Keep up with your climber to avoid accumulating dangerous slack in the climbing rope; however, if your climber is moving too fast and you are having trouble keeping up, tell the climber to slow down. You are in charge of the safety of the climb.
- 10. On a top-rope belay, keep the slack rope from hanging down onto the climb (it's very distracting). To remedy this, use your haul (left) hand to flip the slack rope back and to the brake side. This will flake the rope in a pile on your belay ledge. **Don't take your belay hand off the rope to do this.** This is referred to as "rope management," and should become automatic.
- 11. On a slingshot belay, manage the rope by flaking it off to the brake side while belaying. Again, use your haul hand, not your brake hand.
- 12. You'll tire less if you use your haul hand to actually pull on the climber's rope and use the brake hand to pull the slack through the belay device.
- 13. You will be tempted to learn only right-handed or left-handed belaying. Some belay stances require that you use the opposite hand due to rocks, trees, etc., being in the way. Learn to belay with both hands.
- 14. You MUST get the motions of belaying down as soon as you can. PRACTICE, PRACTICE.

Lowering A Climber

If a climber has finished a slingshot climb, or cannot finish a climb due to injury, difficulty, etc., you can lower him by playing out the rope instead of hauling it in and using the brake hand to vary the tension. Wear a glove on your brake hand to avoid rope burns if that is a problem.

- 1. Take all the slack out of the climber's rope until the rope is as tight as you can get it. Yell "LOWERING" and start with the brake hand back at your hip.
- 2. The climber must sit back in his harness. Don't do **anything** until he leans back and weights the rope. You will feel a slight tension and your brake hand will be holding the climber.
- 3. When the climber says "READY," gently move the brake hand forward and release tension on the brake rope until the rope starts to slide through your brake hand and the brake. Wiggle the belay device if necessary with your left hand, but keep your brake hand firmly on the rope. To increase the descent speed, extend the brake hand forward from your hip (a little at a time).
- 4. Do not go too fast or you may not be able to stop.



Rev. 03/01/03, AMC Basic Climbing Manual

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Page 6–10 • Belaying			

Finishing The Belay

You must continue to keep the climber on belay until they finish the climb and clip in to the anchor system. The climber will then say "OFF BELAY." Always double-check that the climber has anchored safely prior to taking them off belay. Then respond with "BELAY OFF."



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