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## ICE AX Understanding ice axes



### Ice Ax: Understanding Ice Axes

The ice ax is one of the most versatile and important pieces of mountaineering equipment, allowing you to venture onto all forms of snow and ice, enjoying a greater variety of mountain landscapes during more seasons of the year. Without it, safe alpine travel is restricted to easy scrambles. **Many Uses.**

The ice ax's main role is in snow and ice travel, where it provides balance or a point of security to prevent a fall and serves as a means to stop a fall. The design of an ice ax often is a trade-off between features that make the tool better for particular uses.

- **A long ax** is suitable for cross-country travel and scrambling, where it's used as a cane and to provide security in low-angle climbing.
- **A shorter ax** is best for the steeper slopes encountered in alpine climbing.
- **Axes designed for ice climbing** are characterized by even shorter shafts and by specialized design of such elements as the shape of pick and adze and the placement of teeth.
- **Weight** is another consideration. The adage says "Light is right" but don't take this too far. Some very light axes are not designed to withstand the demands of general mountaineering. General mountaineering axes tend to be lighter and less expensive than technical ice tools.

### Parts of the Ice Ax.

- **The head**-which includes the pick and the adze-is usually made of steel alloy, a material strong enough for snow and ice climbing. Although the hole in the head of the ax is commonly called a carabiner hole, most climbers attach their wrist leash through it.
- **The pick** on most ice axes is curved or drooped, a design that provides better hooking action in snow or ice, enabling the ax to dig in when you're trying to stop yourself (self-arrest) after a fall.
  - A **moderate hooking angle** of 65 to 70 degrees from the shaft is right for general mountaineering uses.
  - A **sharper angle** of 55 to 60 degrees is better for technical ice climbing, as it coincides with the arc followed by the ax head as you swing it to plant it into steep ice.
  - **Teeth** on the pick provide grip for ice and hard snow. Ice axes designed for general mountaineering typically have only a few teeth, placed at the end of the pick. Ice tools designed for technical climbing have teeth along the entire length of the pick.
  - May have **positive, neutral, or negative clearance**. The clearance is determined by comparison of the angle of the pick tip relative to the axis of the shaft. In theory, the degree of clearance affects the performance of the ax in self-arrest. A pick with positive clearance (angle points away from the shaft) should penetrate more readily; a pick with negative clearance (angle points toward the shaft) would tend to skate on ice or hard snow. However, the type of clearance actually makes little difference: self-arrest is almost impossible on ice, and in softer snow the pick will dig in regardless of clearance. In any case, you can always modify clearance with a hand file.
- **The adze** of the ax is used mainly to cut steps in hard snow or ice.
  - The flat top of the adze also provides a firm, comfortable platform for the palm of your hand while holding the ax in the self-belay grasp.

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- Adzes for general mountaineering may be flat or curved, straight-edged or scalloped, straight-out or drooped. A flat, straight-edged, nondrooped adze with sharp corners is probably the best all-around tool for cutting steps.
- **The shaft** of the ax will be made of aluminum or a composite material (fiberglass, Kevlar, or carbon filament), or a combination. The wooden shafts of yesterday—often dense, straight-grained hickory—have been replaced by these stronger and more reliable materials.
  - Some shafts are covered at least partly by a rubber material, which helps give surer command of the ax during self-arrest and also dampens vibrations and increases control in planting the pick.
  - You can improve your hold on a shaft that doesn't have a rubber grip by adding athletic grip tape or using gloves with rubberized palms. However, the friction of the shaft covering may keep the ax from readily penetrating the snow when you're using it for a boot-ax belay, probing, or self-belay.
- **The spike**, the metal tip of the ax, must be kept sharp so that it penetrates readily into snow and ice. The ax does come in handy on rocky trails and talus slopes by helping with balance, but this use will dull the spike.

### Ice-Ax Length.

Ice axes range in length from 40 centimeters (about 16 inches) to 90 centimeters (about 3 feet)—still much shorter than the 5-foot alpenstocks of the alpine pioneers. The shortest axes are for technical ice climbing; the longest ones are for tall mountaineers using the ax as a cane on easy terrain. The optimal length for an ice ax may depend more on what you plan to do with it than on how tall you are.

- Axes **less than 60 centimeters** long are ice-climbing tools, excellent for placements on steep slopes. However, these ice tools are not so good for self-arrest; the shorter shafts offer less leverage than a longer ax, and many of the technical pick designs do not lend themselves to the self-arrest technique.
- A length of **60 to 70 centimeters** works well in most alpine situations, where you are climbing moderately steep snow slopes and using the ax for self-belay and self-arrest. An ax of 70 centimeters is the longest that is generally useful for ice climbing.
- **Longer axes** are better for cross-country travel and scrambling and also are good as snow anchors and for probing for cornices and crevasses.

### Ice-Ax Leash.

The leash provides a way to attach the ice ax to your wrist or your harness when you want to ensure it won't be dropped. Although the length of a leash can vary, it usually consists of a piece of accessory cord or webbing attached through the carabiner hole in the head of the ice ax.

- **Short wrist leashes** are favored by those who find them adequate for basic snow and glacier travel. The short leash is easy to use and is an aid to quicker control of the ice ax during a fall.
- Most climbers prefer a **longer leash**. With a long leash, you no longer have to switch the leash from wrist to wrist as you move the ax to the other hand for a change in direction up a snow slope. The long leash also makes the ax more versatile for climbing steep snow or ice.
  - With your hand through the wrist loop, the leash should be just long enough to let you grasp the end of the shaft near the spike.
  - A long leash can be chained to a runner attached to your seat harness, so that the ax can be used as a personal anchor.
- You can easily make a leash yourself from a length of 5-millimeter or 6-millimeter accessory cord or 1/2-inch to 1-inch flat webbing. Tie the ends of the material together with a suitable knot to create a sling, girth-hitch the sling through the carabiner hole, then tie an overhand knot to form a wrist loop.