
Staying Alive

by John Dill, NPS Search and Rescue

Most climbers do a good job coping with the hazards of their sport, yet more than 100 climbing accidents occur in the park every year. What factors contribute to them? What, if anything, can climbers do to avoid them? And just how dangerous is climbing, anyway? With these questions in mind, the National Park Service (NPS) recently examined most of the serious accidents that occurred in the park during the years from 1970 through 1990. The conclusions provide interesting reading for those wishing to stay alive.

Fifty-one climbers died from traumatic injuries in that period. A dozen more, critically hurt, would have died without rapid transport and medical treatment. In addition, there were many serious but survivable injuries, from fractured skulls to broken legs (at least 50 fractures per year), and a much larger number of cuts, bruises, and sprains.

Not surprisingly, most injuries occurred during leader falls and involved feet, ankles, or lower legs; for many, these are the accepted risks of climbing. However, leader falls accounted for only 25 percent of the fatal and near-fatal traumatic injuries; roughly 10 percent were from rockfall, 25 percent from being deliberately unroped, and 40 percent from simple mistakes with gear. Many cases are not clear cut; several factors may share the credit, and it is sometimes hard to quantify the weird adventures climbers have.

Not to be overlooked in the body count are

environmental injuries. Inadequately equipped for the weather, four climbers died of hypothermia and perhaps 45 more would have died from the cold or the heat if they had not been rescued.

Fifteen to 25 parties require an NPS rescue each year. Sixty more climbers stagger into Yosemite's medical clinic on their own, and an unknown number escape statistical immortality by seeking treatment outside the park.

Most Yosemite victims are experienced climbers: 60 percent have been climbing for three years or more, lead at least 5.10, are in good condition, and climb frequently. Short climbs and big walls, easy routes and desperate ones—all get their share of the accidents.

The NPS keeps no statistics on how many climbers use the park, but 25,000 to 50,000 climber days annually is a fair estimate. With this in mind, 2.5 deaths and a few serious injuries per year may seem like a pretty low rate. It's much too high, however, if your climbing career is cut short by a broken hip, or worse. It's also too high when you consider that at least 80 percent of the fatalities, and many injuries, were easily preventable. In case after case, ignorance, a casual attitude, and/or some form of distraction proved to be the most dangerous aspects of the sport.

Environmental Dangers

On October 11, 1983, a climber on El Cap collapsed from heat exhaustion. On October 11, 1984, a party on Washington Column was immobilized by hypothermia. You can expect this range of weather year-round.

Heat

No Yosemite climber has died from the heat, but a half-dozen parties have come close. Too exhausted to move, they survived only because death by drying up is a relatively slow process, allowing rescuers time to get there. Temperatures on the sunny walls often exceed 100° F, but even in cool weather, climbing all day requires lots of water. The generally accepted minimum, two quarts per person per day, is just that—a minimum.



Storms

We still hear climbers say, “It never rains in Yosemite.” In fact, there are serious storms year-round. Four climbers have died of hypothermia and almost 50 have been rescued, most of whom would not have survived otherwise.

Mountain thunderstorms are common in spring, summer and fall. They may appear suddenly out of a clear blue sky and rapidly shift position, their approach concealed by the route you are on. A few minutes warning may be all that you get. Thunderstorms may last only a couple of hours, but they are very intense, with huge amounts of near-freezing water often mixed with hail, strong winds, and lightning. The runoff can be a foot deep and fast enough to cause rockfall. A common result is a panicky retreat, a jammed rope, and cries for help.

No climber has died in such a storm yet because rescuers were able to respond. No climbers have died from lightning strikes either, but there have been several near misses, and hikers on Half Dome and elsewhere have been killed. Get out of the way of a thunderstorm as fast as you can, and avoid summits and projections.

The big Pacific storm systems have proven more dangerous. They sweep through the Sierra at any time of year, most frequently from September through May. They are unpredictable, often appearing back-to-back after several weeks of gorgeous, mind-numbing weather. It may rain on Half Dome in January and snow there in July. These storms are dangerous because they are usually warm enough to be wet, even in winter, yet always cold enough to kill an unprotected climber. They last from one to several days, offering little respite if you can't escape.

With no soil to absorb it, rain on the walls quickly collects into streams and waterfalls, pouring off overhangs and down the corner you're trying to climb up or sleep in. Wind blows the water in all directions, including straight up. It may rip apart a plastic tube tent or blow a portaledge up and down until the tubing breaks or the fly rips. Overhanging faces and other “sheltered” spots are not always immune;

rain and waterfalls several yards away may be blown directly onto your bivy, and runoff will wick down your anchor rope. Even a slow but steady leak into your shelter can defeat you. Temperatures may drop, freezing solid the next pitch, your ropes and your wet sleeping bag.

Once cold and wet, you are in real trouble and your options run out. If you leave your shelter to climb or rappel, you deteriorate more rapidly from the wind and water. Even with good gear, water runs down your sleeve every time you reach up. As your body temperature drops, you begin making dumb mistakes, such as clipping in wrong or dropping your rack. You are seriously hypothermic, and soon you will just hang there, no longer caring. It happens quickly. In two separate incidents, climbers on the last pitch of The Nose left what protection they had to make a run for the top. They all died on that pitch.

Staying put may be no better. If you need help, no one may see you or hear you, and reaching you may take days longer than in good weather. Survivors say they had no idea how helpless they'd be until it happened to them. To find out for yourself, stand in the spray of a garden hose on a cold windy night. How long will you last?

Big-Wall Bivouacs

Despite this grim scenario, reasonable precautions will turn stormy big wall bivouacs into mere annoyances:

- Check the forecast just before you start up, but don't rely on it. For several parties it provided no warning whatsoever.
- Assume you'll be hit by a storm and that you'll not have a choice of bivies. Ask friends to check on you if the weather or the forecast turns bad.
- Evaluate ahead of time the problems of retreat from any point on the route. Did you bring a bolt kit? How about a “cheater stick” for clipping into bolt hangers and stuffing cams into out-of-reach cracks as you flee down an overhanging pitch?

- If it's starting to rain, think twice about climbing "just one more pitch." Once wet, you won't dry out. It's better to set up your bivy while you're still dry.
- Frozen ropes are useless for climbing or retreating, as several parties found out. Put them away early.

All hints and tricks aside, the bottom line is your ability to sit out the storm. Your first priority is to keep the wind and outside water away. Second is to be insulated enough to stay warm, even though you are wet from your own condensation.

- Stick with high-quality gear in good condition, and don't leave key items behind to ease the hauling. Don't go up with a poorly equipped partner; it will be your neck as well.
- For insulation, never rely on cotton or down (even if it's covered with one of the waterproof/breathable fabrics). Even nylon absorbs water.
- Wool, polypropylene, and polyester insulators stay relatively warm when wet, and the synthetics dry the fastest. Take along long underwear, warm pants, a sweater, jacket, balaclava/hat, gloves, sleeping bag, insulating pad, extra socks or booties, and plenty of food and water. Dehydration hastens hypothermia.
- For rain, use coated nylon, sailors' oilskins, or the waterproof/breathable fabrics. Take rain pants and jacket, overmitts, bivy bag, and a hammock or portaledge with waterproof fly. The fly is critical; it must overlap your hammock generously and be of heavy material, in excellent condition, with strong, well-sealed seams. For sleeping on ledges, take a big tent fly or a piece of heavy-duty, reinforced plastic and the means to pitch it. Then hope that your ledge doesn't turn into a lake. Do you know how to run your anchor through the fly without making a hole?

Unplanned Bivouacs

Getting caught by darkness is common, especially on the longer one-day climbs and descent routes, e.g., Royal Arches and Cathedral

Rocks. It happens easily: a late start, a slow partner, off route, a jammed or dropped rope or a sprained ankle. Usually it's nothing to get upset about, but if you are unprepared, even a cold wind or a mild storm becomes serious. One death and several close calls occurred this way.

To avoid becoming a statistic, consider the following gear for each person's day pack: long underwear, gloves, balaclava, rain jacket and pants (which double as wind protection). In warmer weather, all can be of the lightweight variety. If that's too heavy for you, at least take one of those disposable plastic rain quilts or tube tents that occupy virtually no space. Take more warm clothes in colder weather. A headlamp with spare bulb and new batteries is very important for finding safe anchors, signaling for help, or avoiding that bivy altogether. Matches and heat tabs will light wet wood. Food and water increase your safety after a night of shivering.

Descents

Consult the guidebook and your friends, but be wary of advice that the way down is obvious; look the route over ahead of time. If you carry a topo of the way up, consider one for the way down, or a photograph. Your ultimate protection is your route-finding ability, and that takes experience. Some trouble spots: North Dome Gully, the Kat Walk, Michael's Ledge.

Loose Rock

There's plenty of it in Yosemite. Ten percent of all injuries are associated with rockfall, including six deaths and one permanent disability. In several other deaths, loose rock was implicated but not confirmed, e.g., possible broken handholds and failed placements. Spontaneous rockfall is not the problem; all the fatal and serious accidents were triggered by the victim, the rope or by climbers above.

Ropes launch almost as many missiles as climbers do. Watch where you run your lead rope. Use directionals to keep it away from loose and sharp stuff and check it frequently. Keep in mind that your bag or pack, when hauled, may dislodge everything in its path. When you pull your rappel ropes, stand to one side, look up and

watch out for delayed rockfall.

You have no control over a party above you, and by being below you accept the risk. If you are catching up, don't crowd them. Ask for permission to pass. You can probably get by them safely, but remember that climbers have been killed or hurt by rocks dislodged by parties above, including those they allowed to pass. The party you want to pass may have gotten an early start to avoid that risk, and they have no obligation to let you by. When you are above someone else, including your partner, put yourself in their shoes. Slow down, watch your feet and the rope.

Climbing Unroped

Everybody does it to some extent. There's no reason to stop, but good reason to be cautious: 14 climbers were killed and two critically injured while deliberately unroped. At least eight climbed 5.10 or better. Most, if not all, of those accidents were avoidable. You may find yourself unroped in several situations; on third-class terrain, spontaneously on fifth class, and while deliberately free soloing a route.

Third-class terrain may be easy, but add a bit of sand, loose or wet rock, darkness, plus a moment of distraction, and the rating becomes meaningless. Four climbers have died this way, typically on approach and descent routes such as North Dome Gully, all in spots that did not demand a rope.

Sometimes you lose the way on the approach, or unrope at what you thought was the top of the climb, only to find a few feet of "easy" fifth-class terrain blocking your way. Your rope is tucked away in your pack, and you're in a hurry. Before you go on, remember that you didn't plan to free solo an unknown quantity today. Four died this way, falling from fifth-class terrain that they were climbing on the spur of the moment.

Seven of the 14 killed were rappelling or otherwise tied in. They unroped while still on fifth-class rock, for various reasons of convenience, without clipping into a nearby anchor. Remember that your climbing ability has probably been measured on clean, rated routes,

not on unpredictable sand and wet moss. Being a 5.11 climber does not mean you can fly.

Leading

Nine climbers died and six were critically injured in leader-fall accidents involving inadequate protection. Most fell simply because the moves were hard, and several were victims of broken holds. They were all injured because they hit something before their protection stopped them. Either they did not place enough protection (one-third of the cases) or protection failed under the force of the fall (the remaining two-thirds). In every case, their injuries were serious because they fell headfirst or on their sides; the head, neck, or trunk took a lethal blow. Half the victims fell 50 feet or less, the climber falling the shortest distance (25 feet) died, and the longest (270 feet!) survived.

Climbers frequently describe the belaying habits they see on Yosemite routes as "frightening." Before you start up, check your belay. Can your anchor withstand pulls in all directions? Is there more than one piece, with the load shared? Is the tie-in snug and in line with the fall force? Is your belayer experienced with that belay gadget and in position to operate it effectively when you fall? (You'd be surprised.) Will you clip through a bombproof directional as you start up, even on an easy pitch?

Okay. So you know this stuff. You're a little shaky on the lead right now and you've had some trouble getting your pro to stick, but the book said this was 5.10a, and besides, two teenage girls just walked up this pitch. It's only 20 feet more and one of those pieces is bound to hold. Think for a minute. Are you willing to free solo this pitch? Keep your answer in mind as you climb, because poorly placed protection amounts to just that; you may not be deliberately unroped, but you might as well be.

About Falling

There's an art to falling safely—like a cat. Bouldering helps build the alertness required. Controlling your fall may be out of the question on those 200-foot screamers, but it will reduce the risk of injury from routine falls. Whenever possible, land on your feet. Even if

you break your leg, absorbing the shock this way may save your life. Laybacks and underclings hold special risks in this regard. You are already leaning back, and if you lose your grip, the friction of your feet on the rock may rotate you into a headfirst—and backward—dive.

A chest harness will not keep you from tumbling as you free fall, but it will turn you upright as the rope comes tight. This reduces the chance of serious injury during the braking phase and may be lifesaving if you hang there for long, already seriously hurt. The wall may look vertical below you, but even glancing off a steep slab can be fatal. Three climbers died this way.

Pendulum falls are particularly dangerous. If you swing into a corner from 20 feet to one side of your protection, you will hit with the same bone-breaking speed as when striking a ledge in a 20-foot vertical fall. The crucial difference is that you are “landing” on your side, exposing vital organs to the impact.

Learning to Lead

Four of the 15 killed or critically injured in leader falls were good climbers on well-defined routes, but the majority were intermediates, often off route. There may be a couple of lessons in that.

Don't get cocky because you just led your first 5.8, or your protection held on your first fall. Experienced climbers have died from errors “only a beginner would make,” so you have plenty of time left in your career to screw up.

Climbing and protecting are separate skills, but both keep you alive. Don't challenge yourself in both areas at the same time; you may not have the skill and presence of mind to get out of a tight spot. If you're out to push your limits, pick a route that's well defined and easy to protect, place extra pieces for practice and be willing and equipped to back off.

Route finding is another survival skill. A mistake here can quickly put you over your head in climbing, protecting or both. Learn to look ahead and recognize what you want to avoid.

Search and Rescue personnel prepare to short haul an injured climber from Mammoth Terraces 1992. Photo by Mike Ousley.



Climb it mentally before you climb it physically.

The Belay Chain

Whether you are climbing, rappelling, or just sitting on a ledge, the belay chain is what connects you to the rock. There are many links, and mistakes with almost every one have killed 22 climbers, 40 percent of all Yosemite climbing fatalities. In every case the cause was human error. In every case the death was completely preventable, not by the subtle skills of placing protection on the lead, but by some simple precaution to keep the belay chain intact. Experienced climbers outnumbered the inexperienced in this category, two to one.

Before you commit yourself to a system, always apply a few pounds of tension in the directions in which it will be loaded, analyzing it like an engineer. What if this happens...or that? Check every link, from the buckle of your harness to the rock around your anchor. Both lives depend on that system, so go through it with your partner. Nine climbers died in multi-

victim accidents.

Check the system periodically while you're using it. Forces may change direction (two died when their anchors failed for this reason), ropes and slings can wear through (serious injuries and one death), and gear can come undone. (Two died when a wiggling bolt hanger unscrewed its nut; they were relying on a single bolt.)

Are you about to rappel? Stay clipped to the anchor for a few seconds. Check both the anchor and your brake system, as above. If one anchor point fails, will you remain attached to others? Are the knots in your rappel slings secure? Did you check every inch of those fixed slings for damage? Skipping these precautions cost eight lives and resulted in serious injuries.

Two climbers died by rappelling off the ends of their ropes, even though both had tied knots in the ends as a safety measure. In one case the knots pulled through the brake. In the second, the victim forgot to double-check the ropes after a knot had been untied to deal with a problem.

Clip into a new belay point before



unclipping from the old one. During those few, vulnerable seconds, pitons have pulled, hero loops have broken, rocks have struck, and feet have slipped. Three climbers were killed and one critically injured by “failures” of single-carabiner tie-ins and rappel anchors. Be careful of relying on a single non-locking carabiner for any link in the chain.

Ropes were cut in three fatal accidents. They did not break, but were stressed over sharp edges, a condition never foreseen by the manufacturer.

One of the rules most commonly overlooked is *back yourself up*. No matter what initially pulled, broke, slipped, jammed or cut, the incident became an accident because the climber did not carefully ask himself, “What if...”

Beginners

From your first day on the rock, you have the right to inspect, and ask questions about, any system to which you’re committing your life. It’s a good way to learn and a good way to stay alive. If your partner or instructor is offended, find someone else to climb with. Never change the system or the plan, however, without your partner’s knowledge.

Helmets

While we can never know for certain, helmets might have made a difference in roughly 25 percent of the fatal and critical trauma cases. They would have significantly increased—but not guaranteed—the survival chances for five of those fatalities. Furthermore, helmets would have offered excellent protection against less serious fractures, concussions, and lacerations.

States of Mind

This is the key to safety. It’s impossible to know how many climbers were killed by haste or over-confidence, but many survivors will tell you that they somehow lost their good judgment long enough to get hurt. It’s a complex subject and sometimes a touchy one. Nevertheless, at least three states of mind frequently contribute to accidents: ignorance, casualness and distraction.

Ignorance

There is always more to learn, and even the most conscientious climber can get into trouble if unaware of the danger (“I thought it never rained...”). Here are some ways to fight ignorance:

Look in the mirror. Are you the stubborn type? Do you resist suggestions? Could you be a bit overconfident? (Ask your friends.) Several partners have said of a dead friend, “I wanted to give him advice, but he always got mad when I did that. I didn’t realize he was about to die.”

Casualness

“I just didn’t take it seriously” is a common lament. It’s often correct, but it’s more a symptom than a cause; there may be deeper reasons for underestimating your risk. Ignorance is one, and here are some more:

Habit reinforcement The more often you get away with risky business, the more entrenched your lazy habits become. Have you unconsciously dropped items from your safety checklists since you were a chicken-hearted (or harebrained) beginner?

Your attitudes and habits can be reinforced by the experiences (and states of mind) of others. The sense of awe and commitment of the 1960s is gone from the big wall trade routes, and young aspirants with no Grade VIs, or even Vs, to their credit speak casually about them. Even for experts, most accidents on El Cap occur on the easier pitches, when their guard is down.

Memory decay “I’m not going up again without rain gear. I thought I would die!” A week later this climber had forgotten how scared he had been in that thunderstorm. Rain gear was now too heavy and besides, he was sure he’d be able to rap off the next time. Many of us tend to forget the bad parts. We have to be hit again.

Civilization With fixed anchors marking the way up and ghetto blasters echoing behind, it may be hard to realize that the potential for trouble is as high in Yosemite as anywhere else. Some say the possibility of a fast rescue added

to their casualness. Maybe, but who wants a broken leg, or worse, in the first place?

Distraction

It is caused by whatever takes your mind off your work—*anxiety, sore feet, skinny-dippers below*—the list is endless. Being in a hurry is one of the most common causes of accidents.

A focused state of mind is like good physical conditioning: It doesn't happen overnight, and it takes constant practice, but the payoff in both safety and fun is well worth it. Stay aware of your mental state. Are you uneasy before this climb? Learn to recognize that feeling, then ask yourself why this is so, and deal with it. Are you taking shortcuts on this pitch? Could it be that you're distracted? Stop, get your act together, then go.

Rescue

Despite the best of attitudes, an accident can happen to anyone. Self-rescue is often the fastest and safest way out, but whether it's a wise course of action depends on the injury and how well prepared you are. Combining with a nearby party will often give you the margin of safety you need, but do not risk aggravating an injury or getting yourself into a

more serious predicament. Ask for help if you need it. (Sometimes a bit of advice, delivered by loudspeaker, is all that's required.) In making your decision, keep an eye on weather and darkness. Call for help early.

If you don't have formal first aid training (which is strongly recommended), at least know how to keep an unconscious climber's airway open, how to protect a possible broken neck or back, and how to deal with external bleeding and serious blood loss. These procedures are lifesaving, do not require fancy gear, and are easy to learn.

Head injury victims, even when unconscious, may try to untie themselves. If you have to leave someone alone, make escape impossible.

If ropes are lowered to you from a helicopter, do not attach them to your anchors unless you are specifically instructed to do so. If the helicopter has to leave suddenly it could pull you off the wall. Sometimes, however, rescuers will be using a system that does not expose you to that risk and will ask you to anchor a rope. Anchor that rope securely; it may be a rescuer's lifeline. In all cases, follow instructions exactly.