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Cal Joyner
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Dear Forester Joyner,

I wanted to file two objections to the August 2017 Final Apache Leap Special Management Area Management Plan.

1. I am concerned that section 3.1.4 (Page 19) does not provide adequate protection or planning for the resources of the SMA. Seismic monitoring alone seems insufficient to ensure that the natural character and values of the Apache Leap SMA are being protected. I would propose that monitoring such not just be for seismic activity, but also ground deflection and tilt since (1) these would seem to be necessary to monitor the condition of the sheer cliffs and hoodos and (2) this data is being collected for the baseline. Regular monitoring with techniques such as LiDAR could help detect movement and/or dangerous situations before a seismically measurable until an event like a significant rockfall occurs.

2. With regard to Section 3.5.4 (Page 26), regarding the Climbing Management Plan, I am concerned about the consideration of "prohibiting new bolting." I can certainly appreciate the desire to limit unbounded development of new bolted routes, but, as written, this directive suggests that maintenance of existing routes is also being considered.

   The ability to regularly maintain bolts is critical to ensure that climbing remains safe. I have included an article from the American Safe Climbing Association (ASCA) on bolt replacement. This is especially important since many climbers are used to the safe conditions of their local gym. If the area were to receive a reputation for being unsafe this would certainly deter people from visiting, lowering the value as a tourist destination that helps the local economy, stated Desired Conditions from Section 3.5.1 (Page 24). I would hope the final approach considers the safety aspect of being able to maintain this equipment.

Both of these concerns, I feel, are reflected in the first page of my Resolution Copper Project EIS Comment letter.

Again, I thank you for considering my comments and objections.

Sincerely,

Andrew F. Dreher

# Bolts: bomber or time bombs?
## How to tell the difference - and do something about it.

*by Todd J. Vogel - reprinted from Rock and Ice*

*Where is that protection that I needed?*
*Air can hurt you too…*
*Talking Heads, "Air," Fear of Music*

It's your lead. Twenty feet to the first bolt - an old spinner - but the climbing is not too bad, a Tuolumne classic. Twenty-five feet to the next bolt, another spinner with a reddish stain trailing off and a hanger bent from avalanches of two dozen winters; but the next one is nowhere in sight. Or is that it shining in the sun 30 feet out, past that tough-looking spot?

By now most climbers know that clipping 1/4-inch bolts is about as safe as wearing a pink tutu into a North Carolina biker bar. But not everyone knows that replacing suspect bolts is a relatively simple procedure - and one unlikely to result in conflicts with the ethics police.

**Why replace bolts?**

We tend to view bolts - and most fixed protection - as unquestionable. But how would you feel 30 feet out from a #3 brass nut? If only old bolts were that good…

In rock climbing we have always valued high-minded ideals such as tradition, individualism and self-reliance; we must now learn to share responsibility for updating fixed protection. For years bolts - manufactured only for construction applications- have been deteriorating. Climbers, through either ignorance or informed choice, have accepted the narrowing safety margin as part of the game.

Beginning in the mid-'80s, motorized drilling and big bolts have provided the means to make fixed protection much safer. When a new protection technology hits the market climbers update their racks. It's up to us to use the latest fixed-protection technology to update our climbs.

**Old holes or new?**

Until 1992 Tuolumne's Dike Route (one of the first routes in the country to use bolt protection) had protection points consisting of as many as three bolts, each backing up the others. Although this method helps with safety, it does nothing for aesthetics - and can even make it hard to tell the belay anchors from the protection anchors. Removing questionable bolts and enlarging their holes to take new, modern anchors both improves safety and reduces environmental impact.

It is always preferable to use the old bolt hole rather than adding a new scar. Only in a worst-case scenario should a new hole be added. Such situation include bolts (or remnants thereof) that just can't be removed (some self-drill bolts) or botched placements (bolts in poor rock or in a flake, for example),

Never place a new bolt in such a way that the new hanger hides the old bolt hole. It looks pretty, but for maximum strength bolt holes must be a minimum of 10 diameters of the bolt apart (around five inches). Old holes covered with the

replacement hanger of the new bolt are especially insidious, because it's difficult for the passing climber to notice just how close the old hole is, Black Tide, a moderate Joshua Tree classic, has two protection bolts, each protecting a long runout, that have been replaced in this fashion.

**Which bolts to replace?**


To successfully perform fixed anchor maintenance, you should be able to identify the many types of bolts out there. The type of bolt will determine whether or not it needs to replaced and which replacement strategy to use. In general, all 1/4-inch bolts are candidates for replacement; the older they are, the higher the priority - especially if they protect a runout or a bad landing. Likewise, any bolt is suspect if its hanger is loose enough to spin or rattle, has been damaged by rockfall, or is distorted. If the hanger on a new 3/8" or 1/2" bolt spins but tightens easily, it's probably okay - as long as there's solid rock surrounding the bolt hole. Before placing any bolt, tap the rock with a wrench or hammer - if it sounds hollow, place the bolt elsewhere.

The old-style SMC bolt hanger, vintage late 1 970s to early '80s, had problems with weakness and should be replaced. it is slightly thinner than a quarter (25-cent coin), is metallic gray and often has a pale yellow tinge (the new style is thicker than a quarter and has a silvery tinge). Any bolt with a funky hanger (thin homemade aluminum, sheet metal or other jury-rigged contraption) and a small stud exposed to the surface should be considered for replacement.

Two types of bolts that frequently need replacing are compression bolts, which rely on a bend in the metal to create the friction that holds it in the rock, and expansion bolts, which use a sleeve or cone as a wedge to provide friction.

**Compression bolts**

By far the most common iffy bolts are the 1/4-inch Rawl button-head and its threaded-end sister (see photo) - these probably represent 95% of the 1/4-inch bolts in place. in good rock these can be surprisingly strong, but only if the hole has been perfectly drilled - a very rare scenario for hand-drilled placements and impossible to verify. They should be replaced in anything but the best rock - especially if they are spinners or in an orientation (such as a rappel anchor) where an outward pull may result.

This style bolt features a split shaft 1-1/4 to 2 inches long, and can be identified by either the round "button" head that holds the hanger to the rock (the button is about 7/16 inch in diameter approximately the thickness of the narrow side of a Black Diamond #7 Stopper) or by the threaded end of the protruding stud (about 3/16 inch in diameter). The hanger is fastened to the threaded stud with either a six-sided or square nut.

Especially "lucky" climbers might come across another version of this type of anchor - the Rawl 3/16-inch button head. A miniature version of the 1/4-inck button head, this bolt won't hold much more than a wet avalanche poodle.

The 1/4-inck button type can be confused with Rawl's newer style, which has a 5/16-inch diameter shaft and a 5/8-inch diameter button (the thickness of a #9 Stopper) and is much stronger than its 1/4-inch relative. However, compression -

type bolts in coarse-grained rock (Joshua Tree, South Platte) or soft rock (Canyonlands) no matter what the diameter - are almost universally bad. Compression bolts can be easily removed with the standard procedure (see "Basic Replacement Technique," below); spinners can usually be pulled with the crowbar, skipping the piton step.

One potential problem with the threaded style of the Rawl bolt is that the nut occasionally gets stripped from the stud. (Two climbers discovered this the hard way on a Yosemite Glacier Point Apron route, posthumously named Anchors Away.) When replacing this type of bolt, tighten the nut before attempting to pry out the bolt. If it strips off anyway, it might be possible to tap the curved end (cat's claw) of your crowbar tightly into the threads of the stud and pry it out. If that doesn't work, use a 1/4-inch bit on your power drill to drill a new hole right next to the old stud (so close that the drill bit touches the broken stud), and knock the old stud sideways with a hammer into the new hole. This will loosen the stud enough that it can be removed with pliers. Next you'll have to redrill the hole with a 1/2-inch bit and install a 1/2-inch bolt.

**Expansion bolts**

Quarter-inch expansion bolts are generally beyond question - they're all bad. There are a few varieties; all are replaced the same way and share the same complications. When you pull out a bolt that uses a sheath or Sleeve, either may remain in the hole. Although not a problem for power drills - the bits plow right through the remnant - hand-powered drill bits will get stuck in the remaining piece of metal. Don't try to hand-drill this type of bolt unless you have tools to first extract the corroded sleeve from the old hole.

Two types of sheath bolts are common. One is the taper bolt- plenty strong when placed properly, but very weak when installed with the wrong torque. To recognize a taper bolt, look for either an allen or hex head with no threaded stud sticking through. (Some self-drill bolts look like taper bolts on the surface.) Taper bolts require moderate effort to pull, often leaving their sheathes in the hole.

The other variety is the especially scary Star Dryvin nail/sheath bolt. Look for the small nail that has a star imprint on the head and the two halves of the metal sheath on either side of the nail (inside the hole). El Cap Nose climbers before September 1990 will remember these from the last pitch. A little lead sleeve holds the sheath, which may be barely visible, against the nail and usually ends up stuck in the hole - as do the sleeves. Needle-nose pliers will take care of the sleeves, but you'll have to drill out the sheath.

The 3/8-inch Star Dryvin is also problematic. It looks like a bigger version of its cousin, with the star imprint on the nail and a sleeve on either side. Although it used to be the poor-rock anchor of choice (Canyonlands climbers have seen many), it is actually very weak compared to what is available today. Pulling these bolts is easy, but they almost always leave their sheath and corroded sleeves behind. Since their original hole is 3/8 inch, the same size drill bit tends to bind in the hole; starting with a 1/2 inch bit makes the job easier. If possible, pick the sleeves out of the hole with long, thin needle-nose pliers before redrilling with a power drill.

Self-drill bolts can also be hard to replace. One way to recognize them is by their large allen or hex-sided head. Self-drill bolts leave a big plug in the hole that can only be removed by a bit made for drilling metal. These bolts are usually of larger diameters, but are too short to provide any more holding power than a 1/4-inch bolt.

Climbers have used all sorts of other funky bolts in the name of experimentation and thrift. Zamac nail-ins, machine nuts, aluminum dowels and funky Euro things fall into this category. The Yosemite classic Shaky Flakes features Zamac nail-ins (best case-scenario strength: 1,200 pounds) at many protection and belay points. Some of the runouts on this route exceed 40 feet. A worst-case-scenario fall would easily exceed the breaking strength of the such a bolt (webmaster note: the ASCA has rebolted this route).

All the weird bolts I've found are replaced following the same basic steps. Most leave nothing behind in the old hole, so the main chore is removing them - which is frighteningly easy.

**Bolts of choice**


It's often as easy to recognize good bolts as it is to recognize bad ones. Metolius hangers and Rawl five-piece bolts with a hex head of 1/2-inch across or larger are especially dependable. Threaded shaft bolts that show an above surface diameter greater than 1/4-inch are generally dependable.

When choosing replacement bolts, the generally accepted standards are the Rawl five-piece bolt in both -3/8-inch and 1/2-inch widths, and in lengths appropriate for the type of rock - a minimum of three inches for hard rock and six inches for soft. In all but the hardest rock, 1/2-inch bolts are the best choice for strength and durability. An advantage of the five-piece type is that they can be easily removed for replacement when they're old, 100 or so years from now. There are many other viable choices: Petzl Long Life stainless-steel bolts (if price is no object), Hilti metric bolts, Rawl True Bolts and chemical glue-in anchors. Use only stainless-steel bolts and hangers near saltwater. Carbon-steel bolts such as the Rawl five-piece can set up a galvanic reaction with stainless steel hangers; this is particularly dangerous in damp parts of the country or where there's acid rain, and it's safest never to combine the two. Metolius makes an epoxy-coated hanger that eliminates this problem.

**Practice makes perfect**

Before you run out and pull the bolts off some local classic, it's a good idea to practice somewhere where damage won't be a problem. A rock the size of a large bunny will work. Drill a hole and place a 1/4inch bolt (I hope impossible to find at any mountain shops but still available at good hardware stores) and remove it. Topropes provide another opportunity for practice. The first time you're hanging from the rope pulling a real bolt you'll have a lot of gear dangling. Be careful-it's not a bad idea to warn people below what you're up to.

**Bolt responsibly**

Controversy over the impact of climbers on public and private land is not going to go away. Always use camouflaged anchor components when replacing bolts (spray hangers with flat paint before going out), and remove old webbing and slings. Never use power drills where currently banned - the potential exists to establish a permit process for route restoration and maintenance in these places. Much progress has been made in Yosemite and other national parks. Tempting - and altruistic - as unauthorized operations may be, in the long run we have much more to gain by working with land managers.

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## Basic replacement technique

The method you use to pull bolts and redrill holes will vary depending an the type of bolt and other conditions. The following procedure works for most bolts:

- Loosen the old bolt by tapping the hanger from side to side a few times with a hammer.

- Pound a thin piton lengthwise between the hanger and the rock. Particularly tight bolts might require you to start with a thin pin, before using a thicker one.
- Pull the old bolt out with a small crowbar or similar tool.
- Redrill the existing hole to fit the new bolt.
- Install the new bolt by inserting it into the hole and tightening the bait head with a wrench to the recommended torque. (Petzi Long Life bolts do not require tightening.) Empirical evidence suggests that it's not necessary to seal the hole with glue.
- Gloat about your improvement.

In most cases you will want to be either on rappel and hanging from prusiks or ascenders or on a tight belay from above (usually the most efficient method). Another method that works well - especially on more difficult routes or on mixed free and aid climbs - is for one person to lead the pitch, tie off the rope, then let the replacer do his thing while on mechanical ascenders. if the belay anchors desperately need replacing, you'll need to make that change before your second gets to work.

**Tools of the Trade**
People are happy when they know that they're protected..
Just let me tell your why I'm smiling ...
The Bobs, "Helmet, " My I'm Large

The basic piece of hardware is either a hand or power drill. A power tool is more efficient if you're replacing many bolts, but, because of the weight, I prefer a hand drill if I'm only replacing a few bolts. A 1/4" to 3/8" enlargement by hand in Tuolumne granite with a sharp bit takes about 10 minutes by hand. If you're using a power drill, a handdrill backup is critical in case of battery failure - someone might be planning to use the bolt you just removed and will he rather surprised if it's MIA. In addition to the drill, drill hits and other adjunct equipment, you'll need:

- a long thin Bugaboo piton and a long medium Lost Arrow piton
- a good hammer
- a two or so foot long cat's claw, wrecking bar or crowbar with both a
- chisel-type end and a hooked end with a slot for pulling nails
- a tool, such as plastic tubing or a puffer, for cleaning grit and dust out of the new hole
- bolts, hangers, wrenches and whatever hardware the new bolts require for installation
- Vise grips for freeing stuck bits
- needlenose pliers

Make sure every piece of gear is slung securely, so you can hang each one from your rope or gear sling while working. A crowbar falling at terminal velocity could do some serious damage. They don't call it terminal for nothing.

Todd Vogel has repaired more than 400 anchors throughout the West. including many of the bolts on El Cap's Nose Route. He is currently (10/00) a guide and co-owner of The Sierra Mountain Center in Bishop, CA.

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